RESEARCH AND SCIENCE IN ALBERTA 1982-83

July 1984

Alberta

ADVANCED EDUCATION
Planning Secretariat

This report describes the characteristics and magnitude of scientific expenditures in Alberta. It outlines the research and development expenditures in Alberta by all who fund or support such activities. Particular attention is paid to the support provided by the Government of Alberta.

Please forward any comments or questions regarding this report to:

Dr. Bastiaan Heemsbergen
Director
Planning Secretariat
Alberta Advanced Education
10th Floor, Devonian Building
11160 Jasper Avenue
Edmonton, Alberta
T5K 0L1
(403)422-4845

TABLE OF CONTENTS

Page

LIST OF TABLES iii

SYMBOLS, NOTES AND ABBREVIATIONS iv

ABSTRACT

1. Preface vii

2. Summary of Major Findings and Observations viii

NATURE OF REPORT

1. Introduction 1
   1.1 Background 1
   1.2 Data Sources and Cautionary Notes 2
   1.3 Definitions 3
   1.4 Outline 4

SECTION I - RESEARCH AND DEVELOPMENT IN ALBERTA, 1982-83

1. Introduction 7

2. Research and Development Expenditures 7
   2.1 Research and Development Expenditures in Natural Sciences 9
   2.2 Research and Development Expenditures in Social Sciences and Humanities 9

3. Sources of Funds 10
   3.1 Provincial Government 10
   3.2 Federal Government 12
   3.3 Industry 12
   3.4 Universities 13
   3.5 Others 13

4. Performers 14
   4.1 Industry 14
   4.2 Universities 16
   4.3 Federal Government 17
   4.4 Provincial Government 17

5. Application 19
   5.1 Advancement of Science 19
   5.2 Defense 21
   5.3 Energy and Fuels 21
   5.4 Environmental Issues 22
   5.5 Health 22
   5.6 Industrial and Economic Development 22
   5.7 Social Development and Related Areas 23

Page

6. Personnel 24
6.1 Total Employment in Research and Development 24
6.2 Provincial Government 26
6.3 Federal Government 26
6.4 Industry 26
6.5 Universities 28

SECTION II - SCIENTIFIC ACTIVITIES OF THE GOVERNMENT OF ALBERTA

1. Introduction 31

2. Total Expenditures 31
2.1 Alberta Government 31
2.2 Other Provincial Governments 31

3. Natural Sciences and the Social Sciences and Humanities Expenditures 33
3.1 Alberta Government 33
3.2 Other Provincial Governments 33

4. Research and Development and Related Scientific Activities 34
4.1 Natural Sciences 34
4.2 Social Sciences and Humanities 34

5. Performers 35
5.1 Alberta Government 35
5.2 Other Provincial Governments 35

6. Application 37
6.1 Alberta Government 37
6.2 Other Provincial Governments 37

APPENDICES

A. Scientific Activities of the Government of Alberta 1982-83 Survey Results

B. Questionnaires and Guide: Provincial Government Survey

C. Methodology Used In Producing Estimates for the University Sector

LIST OF TABLES

		Page
1.	Research and Development Expenditures in Alberta 1981-82 and 1982-83 and Canada 1982-83	8
2.	Research and Development Expenditures by Source of Funds in Alberta 1981-82 and 1982-83 and Canada 1982-83	11
3.	Research and Development Expenditures of Selected Provincial Governments and the Federal Government 1982-83	11
4.	Research and Development Expenditures by Performer in Alberta 1981-82 and 1982-83 and Canada 1982-83	15
5.	Application of Research and Development Expenditures in Alberta by Performing Sector 1982-83	20
6.	Personnel Engaged in Intramural Research and Development in Alberta and Canada 1982-83	25
7.	Intramural Research and Development Expenditures Per Scientific and Professional Personnel, Alberta and Canada 1982-83	27
8.	Expenditures on Scientific Activities of Selected Provincial Governments and the Federal Government 1982-83	32
9.	Expenditures on Scientific Activities of Selected Provincial Governments by Performer 1982-83	36
10.	Expenditures on Scientific Activities of Selected Provincial Governments by Application 1982-83	38

SYMBOLS

..	figures not available
--	nil or amount too small to be expressed
e	estimates
r	revised figures

NOTES

1. Totals may not be the sums of component parts due to rounding.
2. Figures cited for 1981-82 may reflect revision of previously published estimates.

ABBREVIATIONS

NSE	Natural Sciences and Engineering
SSH	Social Sciences and Humanities
R&D	Research and Development
ARC	Alberta Research Council

ABSTRACT

1. PREFACE

This report describes the characteristics and magnitude of research and science expenditures in Alberta during the fiscal year 1982-83. An introductory section provides background and outlines the organization of the report. Section I outlines research and development expenditures in Alberta by all funding and performing sectors, and examines areas of application and personnel components. Section II focuses on the Alberta Government's expenditures for both research and development and related scientific activities and draws comparisons with expenditures of other Provincial Governments.

The data contained in this report were based primarily on an annual Statistics Canada survey of scientific activities of the Government of Alberta, various other statistical surveys conducted by Statistics Canada, and estimates produced by the Planning Secretariat of Alberta Advanced Education.

As this report is exploratory in nature and represents one of the few attempts at documenting all expenditures on research and science in Alberta, it should be used with caution. Due to limitations in the available data, these figures should be considered only as reasonable approximations.

2. SUMMARY OF MAJOR FINDINGS AND OBSERVATIONS

1. **Total Research And Development Expenditures By All Sectors In The Province Were Approximately $539 Million During The Fiscal Year 1982-83 (Table 1).**

   This represents an increase of 8 percent over the $501 million spent in 1981-82, and accounts for approximately 11 percent of all research and development expenditures in Canada. On a per capita basis, research and development expenditures in Alberta ($230 per capita) were greater than those for Canada as a whole ($203 per capita). As a proportion of Gross Domestic Product, Alberta's expenditures on research and development were 31 percent lower than that of Canada.

2. **Natural Sciences Research And Development Expenditures In Alberta Were Approximately $488 Million. Social Sciences Research And Development Expenditures Were Approximately $51 Million (Table 1).**

   Natural sciences research and development activity accounted for 91 percent of all research and development expenditures in Alberta, with the remaining 9 percent expended in social sciences research. The same ratio of expenditures existed for Canada as a whole.

3. **The Alberta Government Funded 22 Percent ($118 Million) Of Total Research And Development Expenditures In Alberta (Table 2).**

   The Alberta Government's expenditures on research and development increased 24 percent over 1981-82 expenditures. On a per capita basis, the Alberta Government continued to fund research and development at over three times the level of any other Provincial Government, and in total spent only slightly less than the Province of Ontario.

4. **The Federal Government Funded 20 Percent ($108 Million) Of Total Research And Development Expenditures In Alberta (Table 2).**

   This represents an increase of $14 million over the $94 million spent in 1981-82, and accounts for approximately 6 percent of the Federal Government's total research and development expenditures in Canada. The Federal Government was the major contributor to sponsored research at Alberta Universities.

5. **Industry Funded 33 Percent ($180 Million) Of Total Research And Development Expenditures In Alberta (Table 2).**

   Industry decreased its expenditures on research and development in Alberta by $20 million over 1981-82, due primarily to decreases in expenditures by the oil and gas and service industries. Alberta Industry's share of support for research and development was below the Canadian average.

6. **Alberta Universities, From Operating Funds, Supported 16 Percent ($87 Million) Of Total Research And Development Expenditures In Alberta (Table 2).**

   Universities are estimated to have increased their support of unsponsored research by $11 million since 1981-82. In addition, sponsored research in the university sector has grown by 24 percent from $61 million in 1981-82 to $75 million in 1982-83.

7. **Industry Performed 47 Percent ($256 Million) Of The Total Dollar Value Of All Research And Development Activities In Alberta (Table 4).**

   Industry was the major performer of research and development activities in Alberta, particularly in the natural sciences. Alberta Industry accounted for 11 percent of all industrial research in Canada. Activities were directed primarily toward oil and gas production and petroleum-based chemical research.

8. **Alberta Universities Performed 30 Percent ($162 Million) Of The Total Dollar Value Of Research And Development Activities In Alberta (Table 4).**

Approximately 46 percent of the research performed by Alberta universities was sponsored by external organizations. Seventy percent of the dollar value of research and development activities performed by Alberta Universities was in the natural sciences; the remaining 30 percent was in the social sciences. Alberta Universities remain the primary performers of research and development in the social sciences.

9. **The Federal Government Performed 9 Percent ($50 Million) Of The Total Dollar Value Of Research And Development Activities In Alberta (Table 4).**

The Federal Government, through its research establishments located in Alberta, performed 46 percent of the research and development which it funded in the Province. This amounted to 5 percent of all research and development performed by the Federal Government in Canada.

10. **The Alberta Government, Including The Alberta Research Council, Performed 11 Percent ($57 Million) Of The Total Dollar Value Of Research And Development Activities In Alberta (Table 4).**

As a proportion of total expenditures on research and development, the Government of Alberta performed 48 percent of the activities it funded in 1982-83, compared with 45 percent in 1981-82. This increase brings the Provincial Government's performance of research and development nearer the average of 55 percent for other Provincial Governments surveyed.

11. Approximately 47 Percent ($252 Million) Of Research And Development Expenditures In Alberta Were Directed Toward The Area Of Energy and Fuels (Table 5).

Research and development expenditures in the area of energy and fuels represented 88 percent of all research and development activity performed by Alberta Industry, 31 percent of such activity by the Provincial Government, and 17 percent of such activity by the Federal Government.

12. Excluding University Personnel, 1 612 Scientific And Professional Personnel As Well As 1 952 Technical And Other Support Personnel Were Employed In Research And Development Activity In Alberta (Table 6).

Of scientific and professional personnel employed in Alberta, (excluding those employed by Universities), 59 percent were employed in Industry, 21 percent in Federal establishments, 11 percent in Alberta Government Departments and 9 percent in the Alberta Research Council.

13. Total Expenditures On Scientific Activity By The Alberta Government Were $170 Million In 1982-83 (Table 8).

Of total scientific activity expenditures, approximately $118 million was in support of research and development activities and $53 million was for related scientific activities. Expenditures on total scientific activity increased by 13 percent over the preceding fiscal year.

NATURE OF REPORT

1. INTRODUCTION

Research and science continue to play an increasingly important role in the economies of both Canada and the Province of Alberta. There is every indication that the future economic strength of the Province and the nation will be strongly influenced by the support of research and development by governments, universities, and industry.

This report describes the characteristics and magnitude of scientific expenditures in Alberta. It outlines the research and development expenditures in Alberta by all who fund or support such activities. Particular attention is paid to the support provided by the Government of Alberta.

The data upon which this report is based are difficult to compile in a consistent fashion. While the methods used in the preparation of this material have been improving, caution should be exercised in drawing comparisons with other similar data sources.

1.1 Background

Since 1973-74, an annual survey of the scientific activities of the Government of Alberta has been carried out by Statistics Canada (currently in co-operation with the Department of Advanced Education and the Alberta Bureau of Statistics). This survey provides the only continuing historical data base on the scientific activities of the Government of Alberta, and represents one of the few reliable data bases available to review the overall scientific activities of the Alberta Government. (The 1982-83 survey results are found in Appendix A.)

In order to provide a comprehensive information base to aid in formulating policy decisions, the results of this survey have been placed in a broader comparative context. Research and Science in Alberta, 1982-83 offers a broad examination of the existing data relating to the scientific expenditures of the Federal Government, Alberta Industry, Alberta Universities, and other Provincial Governments as well as the Government of Alberta. By comparing the

research and development performance of each sector of the Alberta and Canadian economies, a clearer perspective of the total effort of research and science may emerge. There has been a growing recognition among all governments of the important place of research and development in an expanding economy. As a result, similar provincial surveys of scientific activities are currently conducted in four provinces: British Columbia, Alberta, Saskatchewan and Ontario.

1.2 Data Sources And Cautionary Notes

The data contained in this report are based on Statistics Canada surveys of scientific activities and on estimates produced by the Planning Secretariat of the Alberta Department of Advanced Education. Due to limitations in source information, these estimates should be considered only as reasonable approximations.

Information on scientific expenditures in Alberta has been collected, where possible, as reported by the funder. This approach is feasible when dealing with Federal or Provincial Governments, as surveys of their expenditures on scientific activities are conducted annually. For various reasons a performer may not identify the same funding as the agency providing the funding. Therefore, discrepancies arise when the performer's report is the only source of data for a given sector.

This is the case when accounting for expenditures by industry. The Statistics Canada publication, Industrial Research and Development Statistics, offers data from an annual survey of Canadian Industry engaged in scientific activities. Since the publication summarizes expenditures by report of the performer, irreconcilable differences exist between these figures and those reported in similar data sources by survey of the funder. Therefore, caution should be exercised when comparing figures from various data sources.

Data on university expenditures are estimates produced by the Planning Secretariat of Alberta Advanced Education. These estimates are derived from annual financial statements of Alberta Universities and from studies which indicate that a fixed percentage of the operating expenditures of universities

is attributable to research and development activity (Report of the Study On The Costs of University Research, Canadian Association of University Business Officers, 1982). Estimates of university expenditures on research and development present the greatest potential for error; however, no figures of a more precise nature presently exist. (A brief discussion of the methodology used in deriving these data is contained in Appendix C.)

All figures in this report, unless otherwise noted, refer to expenditures on research and development only. In order to estimate the extent of research and development activity in Alberta, foreign payments to Industry for research and development performed in Alberta are included, but payments for research performed outside of the country are not. Capital expenditures on research and development are included for all sectors, with the exception of the University sector (See Appendix C). All figures are in current dollars.

1.3 Definitions

Scientific activities are defined as those scientific and technological activities which involve the generation, dissemination and initial application of new scientific and technological knowledge. These activities include both research and development activities and related scientific activities. Scientific activities are classified as belonging either to the natural sciences and engineering, or to the social sciences and humanities. (Detailed definitions of the terms used in this report are found in Appendix B.)

Research and development activities are defined as creative work undertaken on a systematic basis towards the acquisition and application of new scientific and technological knowledge.

Related scientific activities are defined as those activities which are supportive of research and development, but which do not include the acquisition of new knowledge. By convention, they include such activities as education support, statistical surveys, information services, special services and studies (systematic investigations carried out to provide information needed for planning or policy formulation), and the provision of museum services.

1.4 Outline

This report consists of two major sections. The first section 'Research and Development in Alberta', outlines the total expenditures on research and development activity in Alberta for the fiscal year 1982-83, identifies the major funders and performers of these activities, and describes research and development by area of application.

The second section, 'Scientific Activities of the Government of Alberta', provides a more detailed view of the Alberta Government's expenditures. It includes information on both research and development activities and related scientific activities. Comparisons have been made with other Provincial Governments for which data are available.

SECTION I
RESEARCH AND DEVELOPMENT IN ALBERTA
1982-83

1. INTRODUCTION

This section describes the characteristics and magnitude of research and development expenditures in Alberta during the fiscal year 1982-83. It outlines the expenditures of the Alberta Government, the Federal Government, Universities, Industry, and 'Others', and identifies the major performers of research and development activities. Areas of application have also been identified as have the personnel components of each sector.

2. RESEARCH AND DEVELOPMENT EXPENDITURES

In 1982-83, approximately $539 million was spent on research and development activities in Alberta. This represented an increase of 8 percent over 1981-82, and accounts for approximately 11 percent of all research and development expenditures in Canada (Table 1).

As an indication of how expenditures on research and development relate to the overall performance of the Provincial economy, research and development accounted for 1.04 percent of Alberta's Gross Domestic Product (GDP) in 1982-83, roughly the same proportion as in 1981-82. The comparable research and development expenditure in Canada was 1.35 percent of Canada's GDP (1.23 percent for 1981-82).[1]

Roughly $230 per capita were spent on research and development activities in Alberta compared with $203 per capita in Canada. In 1981-82, about $227 per capita were spent on research and development in Alberta as compared with $178 per capita across Canada.[2]

---

[1] Alberta Advanced Education, Planning Secretariat, estimates, July, 1984; Alberta Bureau of Statistics, Alberta Statistical Review Annual 1982; Statistics Canada, Scientific Activities of the Government of Alberta 1982-83 Survey Results.

[2] Ibid.

TABLE 1

RESEARCH AND DEVELOPMENT EXPENDITURES
IN ALBERTA 1981-82 AND 1982-83,
AND CANADA 1982-83

Field of Science	$ Millions (%)					
	Alberta 1981-82(r)		Alberta 1982-83		Canada 1982-83	
Natural Sciences	456	(91)	488	(91)	4 591	(91)
Social Sciences	46	(9)	51	(9)	427	(9)
Total	501	(100)	539	(100)	5 018	(100)

Sources: Alberta Advanced Education, Research and Science in Alberta 1981-82; Alberta Advanced Education, Planning Secretariat, estimates, July, 1984; Alberta Research Council, Annual Report 1983; Statistics Canada, Federal Scientific Establishments 1982-83; Statistics Canada, Scientific Activities of the Government of Alberta 1982-83 Survey Results; Statistics Canada, Science and Technology Statistics Division, estimates, April, 1984; University of Alberta, Report of the Governors 1982-83; University of Calgary, Annual Report 1982-83; University of Lethbridge, Financial Statements 1982-83.

2.1 Research and Development Expenditures in the Natural Sciences

In Alberta, research and development expenditures in the natural sciences were approximately $488 million in 1982-83, up by 7 percent over 1981-82. These expenditures represented roughly 91 percent of all research and development expenditures in Alberta, and 11 percent of all natural sciences research and development expenditures in Canada. Approximately $209 per capita were expended on natural sciences research and development activities in Alberta, while approximately $186 per capita were expended on natural sciences research and development activities in Canada.

2.2 Research and Development Expenditures in the Social Sciences

In Alberta, research and development expenditures in the social sciences were approximately $51 million in 1982-83, an increase of $5 million or 11 percent over 1981-82. This represented roughly 9 percent of all research and development expenditures in Alberta, and 12 percent of all social sciences research and development expenditures in Canada. Approximately $22 per capita were expended on social sciences research and development activities in Alberta, while approximately $17 per capita were spent on social sciences research and development in Canada (Table 1).

3. SOURCES OF FUNDS

Alberta's research and development activities were funded by five main sectors: the Provincial Government, the Federal Government, the Industrial Sector, Universities, and 'Others' (primarily private non-profit organizations and foreign sources). In 1982-83, Industry provided 33 percent of all research funds, the Provincial Government 22 percent, the Federal Government 20 percent, Universities 16 percent, and 'Others' 9 percent. (The support by 'Others' includes foreign funding of Industrial research and development.) In Canada, Industry funded approximately 38 percent of all research and development expenditures, the Federal Government 35 percent, Universities 14 percent, Provincial Governments 7 percent, and 'Others' 6 percent (Table 2).

3.1 Provincial Government

In 1982-83 the Provincial Government was the second largest funder of research and development activities. The Alberta Government was the source of $118 million in research and development funds, accounting for 22 percent of total research and development expenditures in Alberta (Table 2).

The Alberta Heritage Foundation for Medical Research, although funded from the proceeds of a $300 million endowment by the Provincial Government, is considered for the purposes of this analysis, to be a private non-profit research organization. Thus its expenditures of $17 million, excluding scholarships, for 1982-83 are included under 'Others'.

The Ontario Government expended only slightly more on research and development than did the Alberta Government. In 1982-83, the Ontario Government's expenditures on research and development were roughly $122 million. The British Columbia Government's expenditures on research and development were $25 million, while Saskatchewan's expenditures were $12 million. On a per capita basis, the Alberta Government spent over three times more on research and development than any other Provincial Government for which data were available (Table 3).

TABLE 2

RESEARCH AND DEVELOPMENT EXPENDITURES
BY SOURCE OF FUNDS IN ALBERTA 1981-82 AND 1982-83,
AND CANADA 1982-83

Source of Funds	$Millions (%)		
	Alberta 1981-82(r)	Alberta 1982-83	Canada 1982-83
Provincial Government(s)	95 (19)	118 (22)	373 (7)
Federal Government	94 (19)	108 (20)	1 750 (35)
Industry	200 (40)	180 (33)	1 908 (38)
Universities	76 (15)	87 (16)	693 (14)
Others	36 (7)	46 (9)	294 (6)
Total	501 (100)	539 (100)	5 018 (100)

Sources: See Table 1.

TABLE 3

RESEARCH AND DEVELOPMENT EXPENDITURES OF
SELECTED PROVINCIAL GOVERNMENTS AND
THE FEDERAL GOVERNMENT 1982-83

Field of Science	Governments $Millions (%)				
	Alberta	Ontario	Saskatchewan[1]	British Columbia	Federal (in Canada)
Natural Sciences	115 (98)	100 (82)	12 (96)	24 (96)	1 655 (95)
Social Sciences	2 (2)	22 (18)	-- (4)	1 (4)	95 (5)
Total	118 (100)	122 (100)	12 (100)	25 (100)	1 750 (100)

Notes: 1. Saskatchewan's social sciences expenditure amounted to half a million dollars, or 4 percent of the total.

Sources: Statistics Canada, annual surveys of scientific activities of the respective provinces, 1982-83; Statistics Canada, Science and Technology Statistics Division, estimates, April, 1984.

3.2 Federal Government

In 1982-83, the Federal Government funded approximately $108 million of the research and development activities in Alberta, up from $94 million in 1981-82.[1] This sector was the source of approximately 20 percent of total research and development expenditures in Alberta, compared with 35 percent of all research and development in Canada. Support of research in Alberta accounted for 6 percent of the Federal Government's total research and development expenditures in Canada (Table 2).

In 1982-83, the Federal Government's extramural expenditures on research and development in Alberta were approximately $58 million, excluding money transferred to the Province through the Alberta/Canada Energy Resources Research Fund. (Funds transferred to the Province under this agreement are reported as provincial research and development expenditures.)

3.3 Industry

Although in 1982-83 Industry remained the primary funder of research and development in Alberta, its expenditures decreased 11 percent over 1981-82. Alberta Industry spent approximately $180 million on research and development in 1982-83, down from $200 million in 1981-82. The proportion of research in Alberta funded by the private sector decreased from 40 percent in 1981-82 to 33 percent in 1982-83. Alberta Industry's expenditures on research and development as a proportion of all Industry funded research and development in Canada decreased to 9 percent in 1982-83 from 11 percent in 1981-82 (Table 2).

Since 1979-80, Alberta Industry has made significant capital expenditures on research facilities. In 1982-83, capital expenditures increased 83 percent over 1981-82, rising from $46 million to $84 million. Once the construction

---

[1]Federal tax incentives to the private sector are not considered direct funding for research and development, and are therefore not included in this summary.

of these research facilities is complete, total research and development expenditures could fall considerably.

3.4 Universities

In 1982-83, it is estimated that Alberta Universities, through their operating expenditures, funded approximately $87 million of research and development activities in Alberta, up from $76 million in 1981-82. This sector accounted for approximately 16 percent of the total research and development expenditures in Alberta, and represented 13 percent of all expenditures by Canadian universities on research and development in Canada (Table 2). (These estimates do not include research supported by sources external to the universities, as these funds are recorded under the sector which provided the funds. See Appendix C for the methodology used to estimate university support for research and development activities.)

3.5 'Others'

'Other' organizations, primarily private non-profit organizations and foreign sources, funded approximately $46 million of research and development activities in Alberta in 1982-83. This sector accounted for approximately 9 percent of the total expenditures on research and development in Alberta and approximately 16 percent of total expenditures by 'Other' funders on research and development in Canada (Table 2).

Foreign funding of Industrial research and development accounted for $21 million of total funding by 'Others'. The remaining funds (approximately $25 million) were provided primarily by Alberta's private non-profit organizations for research and development performed by the University sector. The Alberta Heritage Foundation for Medical Research accounted for the largest expenditure by a private non-profit organization, with $17 million, excluding scholarships, being provided to Alberta Universities for research and development activities.

4. PERFORMERS

The two major performers of research and development activities in Alberta were the Industry and University sectors. Together these sectors accounted for 77 percent of the dollar value of research and development activities in Alberta. The Federal Government and Provincial Government Departments accounted, respectively, for 9 percent and 4 percent of all research and development performed in Alberta. The Alberta Research Council accounted for an additional 6 percent of expenditures for research and development activities in 1982-83 (Table 4).

4.1 Industry

In 1982-83 Industry remained the primary performer of research and development in Alberta in spite of a 3 percent decrease in intramural expenditures. Industry accounted for $256 million or approximately 47 percent of the total dollar value of research and development activities in Alberta. Nationally, Industry accounted for the same proportion of all expenditures for research and development (Table 4).

Of the $256 million expended intramurally by industry, funds for 13 percent (approximately $33 million), were received from the Provincial Government and 11 percent (approximately $27 million) was received from the Federal Government, for a total of nearly $60 million. Foreign support for research and development performed by Alberta Industry amounted to $21 million, accounting for 8 percent of Industry's research and development funding.

The 3 percent decrease in research and development expenditures by Alberta Industry in 1982-83 appears to have resulted primarily from decreased spending by the service industries, where research and development expenditures decreased from $28 million in 1981-82 to $18 million in 1982-83, and by the petroleum recovery industries, where oil and gas drilling expenditures decreased from $103 million in 1981-82 to $99 million in 1982-83.

TABLE 4

RESEARCH AND DEVELOPMENT EXPENDITURES BY PERFORMER IN ALBERTA 1981-82 AND 1982-83, AND CANADA 1982-83

Performer	$Millions (%)					
	Alberta 1981-82(r)		Alberta 1982-83		Canada 1982-83	
Provincial Government(s)						
Intramural	14	(3)	23	(4)		
Research Council(s)	29	(6)	34	(6)		
Subtotal	43	(9)	57	(11)	197	(4)
Federal Government	43	(9)	50	(9)	1 094	(22)
Industry	262	(52)	256	(47)	2 381	(47)
Universities	137	(27)	162	(30)	1 297	(26)
Others						
Hospitals and Health Organizations	13	(3)	11	(2)		
Other	3	(1)	3	(1)		
Subtotal	16	(3)	14	(3)	49	(1)
Total	501	(100)	539	(100)	5 018	(100)

Sources: See Table 1.

4.2 Universities

The second major performer of research and development activities in Alberta in 1982-83 was the University sector. It performed approximately 30 percent or $162 million of research and development activities in Alberta, compared with the national average for universities of 26 percent (Table 4).

Approximately 70 percent was in the natural sciences, where with expenditures of $113 million, Alberta Universities performed approximately 23 percent of the dollar value of natural sciences research and development activities in Alberta. The remaining 30 percent of the total dollar value of research and development performed by Alberta Universities was in the social sciences.

Universities are the major performers of research and development in the social sciences. The $49 million in social sciences research that Alberta Universities performed accounted for 97 percent of the total dollar value of social sciences research in Alberta. This particularly high contribution results partly from the fact that, although other sectors are active in scientific activities in the social sciences, little of their work can be classified as research and development. For example, in 1982-83 Provincial Government Departments performed $27 million of scientific activity in the area of social sciences, but of this only $2 million was designated as research and development.

Approximately 46 percent of the dollar value of the research and development performed by the universities was sponsored or funded by external organizations. The remaining 54 percent was funded through university operating expenditures. Approximately 6 percent of the total dollar value of research and development performed by the universities in the social sciences was sponsored by external organizations, compared to nearly 64 percent sponsorship in the natural sciences.

The major external sponsor of research activities at Alberta Universities is the Federal Government, accounting for 41 percent of all sponsored research in 1982-83. Private Non-profit Organizations funded 34 percent of sponsored research, the Provincial Government 22 percent and Industry 4 percent. The

Heritage Foundation for Medical Research represented a major proportion of the support provided by 'Other' organizations with a grant of $17 million to Universities for research.

4.3 Federal Government

In 1982-83, Federal Government scientific establishments located in Alberta expended $50 million, accounting for 9 percent of all research and development in Alberta. Approximately 46 percent of all research and development funded by the Federal Government in Alberta was expended intramurally. Nationally, the Federal Government performed approximately 62 percent of the research and development activities it funded. Virtually all of the research performed by the Federal Government in Alberta was in the natural sciences (Table 4).

4.4 Provincial Government

Although the Provincial Government is still considered primarily a funder rather than a performer of research and development, intramural expenditures by the Alberta Government Departments rose from $14 million in 1981-82 to $23 million in 1982-83, a 64 percent increase in research and development activities (Table 4).

Hospitals and Medical Care, the Department of Agriculture and the Executive Council account for some of this increase, with current expenditures in 1982-83 showing, respectively, 26, 25 and 23 percent increases over 1981-82 expenditures. However, capital expenditures, which increased from $2 million in 1981-82 to $8 million in 1982-83, accounted for most of the increase in intramural expenditures. Together, the Alberta Provincial Departments and the Alberta Research Council performed 11 percent of all research and development activities in Alberta. (Detailed information can be found by referring to appropriate tables in Appendix A.)

Provincial Government Departments performed approximately 20 percent of the total dollar value of research and development activities funded by the Government of Alberta, and the Alberta Research Council performed another 27 percent. Other Provincial Governments performed proportionately more of

the research they funded, and the Provincial Research Organizations proportionately less. During 1982-83, British Columbia performed 56 percent of the value of research and development it funded, with an additional 5 percent performed by the British Columbia Research Council. In Saskatchewan, 24 percent was performed intramurally and 29 percent was performed by the Saskatchewan Research Council. The Ontario Government performed 49 percent of the total dollar value of the research and development activities it funded, and the Ontario Research Foundation performed an additional 3 percent.

Industry was commissioned to perform approximately 28 percent of the total dollar value of the Alberta Government's expenditures on research and development. The proportion of the Ontario Government's expenditures performed by Industry was 11 percent; in British Columbia it was 9 percent; in Saskatchewan, Industry's share was 7 percent.

Universities received approximately 14 percent of the Alberta Government's research and development funds. The comparable figure for Saskatchewan was 38 percent, for Ontario 26 percent, and for British Columbia 21 percent.

'Other' performers, including Hospitals and Health Organizations, received approximately 12 percent of the Alberta Government's expenditures for research and development. The comparable figure for Ontario was 11 percent, for British Columbia 8 percent, and for Saskatchewan 3 percent.

5. APPLICATION

An attempt has been made to categorize research and development expenditures in Alberta in 1982-83 by area of application. The data on Provincial Government expenditures by area of application are fairly reliable. However, techniques used in combining this information with information on application of expenditures in other sectors (Industry, the Federal Government, and the Universities) lack precision. Extra difficulty was encountered in 1982-83 due to changes in source data categorization by Statistics Canada. Therefore, caution should be exercised when interpreting these figures.

The primary performers of research and development are identified for each application area; however, no attempt has been made to categorize expenditures by funding source. Although sectors may have a strong focus in the performance of research and development (such as Industry's role in energy and fuels research), it should be remembered that funding is often received from several agencies. Because the Government of Alberta can be considered to be primarily a funder rather than a performer of research, its support role in many areas of application may be overlooked. In 1982-83, the Provincial Government was the source of 22 percent of all research and development expenditures in the Province. (Refer to Table 9 for a summary of total science expenditures of the Government of Alberta by area of application.)

Research and development expenditures have been broken into eight areas of application: Advancement of Science, Defense, Energy and Fuels, Environmental Issues, Health, Industrial and Economic Development, Social Development and Related Areas, and Transportation and Communications (Table 5).

5.1 Advancement of Science

It is estimated that approximately $69 million was spent on research and development activities related to the general advancement of science. This represented roughly 13 percent of all research and development expenditures in Alberta. With the exception of approximately $5 million of research performed by the Alberta Research Council, this figure largely reflects the activities of Alberta's Universities. In 1982-83 the University sector accounted for

TABLE 5

APPLICATION OF RESEARCH AND DEVELOPMENT
EXPENDITURES IN ALBERTA
BY PERFORMING SECTOR
1982-83

Application	Performing Sector $ Thousands						
	Province	ARC	Federal	Industry[1]	University	Others	Total
Advancement of Science	612	5 149	--	107	62 929	678	69 475
Defense	--	--	11 400	--	--	--	11 400
Energy and Fuels	10 687	7 067	8 686	226 000	--	--	252 360
Environmental Issues	2 905	3 953	904	36	--	30	7 828
Health	891	--	100	--	40 677	11 191	52 859
Industrial and Economic Development	7 276	17 468	29 300	27 355	9 387	2 076	92 862
Social Development and Related Areas	968	5	--	50	49 271	100	50 394
Transportation and Communications	--	3	--	1 000	--	--	1 003
Total	23 340	33 646	50 310	255 548	162 264	14 075	539 183

Notes: 1. In order to comply with the secrecy section of the Statistics Act, Industry may not list expenditures for certain industry groupings. For this reason Industry expenditures of approximately $1 million could not be grouped by application.

Source: Alberta Advanced Education, Planning Secretariat, estimates, July, 1984.

91 percent of research activity related to the advancement of science (Table 5).

The classification of research and development activities under this heading, in particular, involves problems of definition. This area involves research done for the general advancement of science and refers to basic rather than applied research. With the exception of the activities of a few faculties (such as Agriculture and Forestry, or Medicine, where area of application is reasonably clear), it is often difficult to classify the research activities of the universities. In recognition of the major role played by the universities in augmenting existing knowledge in all fields, much of their research activity was identified as serving the advancement of science.

5.2 Defense

Approximately $11 million was spent on activities related to defense, 2 percent of total research and development expenditures. Only the Federal Government reported expenditures in this application area.

5.3 Energy and Fuels

Approximately $252 million was spent on research and development activities in the area of energy and fuels in Alberta in 1982-83, representing 47 percent of all research and development expenditures in Alberta. The major performer of research and development activities in energy and fuels was Industry, accounting for 90 percent of expenditures in this area of application. The Provincial Government performed 4 percent, the Federal Government 3 percent, and the Alberta Research Council 3 percent (Table 5).

Energy and fuels includes the sub-fields of fossil fuels, hydro-electric energy, and nuclear energy. It appears that most of the expenditures in this area were related to fossil fuels.

5.4 Environmental Issues

An estimated $8 million was spent on research and development activities related to environmental issues. The Alberta Research Council was the primary performer, accounting for 50 percent of expenditures in this area, while the Provincial Government Departments accounted for 37 percent (Table 5).

The area of environmental issues includes research activities intended to preserve or restore environmental quality, including work on pollution, but excluding related medical research.

5.5 Health

It is estimated that approximately $53 million was spent on health-related research and development activities in Alberta in 1982-83. This represented roughly 10 percent of all research and development expenditures in Alberta. Universities accounted for 77 percent of health related research and development and Hospitals and Health Organizations 21 percent (Table 5).

The area of health involves activities related to the maintenance and improvement of the physical well-being of the population. Included are research activities in medicine, dentistry, pharmacy, nursing and rehabilitation medicine.

5.6 Industrial and Economic Development

It is estimated that approximately $93 million was spent on research and development activities in the area of industrial and economic development, representing roughly 17 percent of all research and development expenditures in Alberta in 1982-83. The Federal Government performed the greatest share of research in this area (32 percent) in its research establishments throughout the province. Industry accounted for 30 percent, the Alberta Research Council 19 percent, the University sector 10 percent, and the Provincial Government Departments 8 percent (Table 5).

Industrial and economic development includes research activities related to agriculture, fisheries, forestry, manufacturing and minerals. In 1982-83, a large proportion of expenditures was related to agriculture and forestry. The Federal Government was the primary performer in this area with approximately $29 million expended on research and development; the Provincial Government, including the Alberta Research Council, expended approximately $10 million; and the University sector accounted for approximately $9 million. In the sub-field of manufacturing, Industry was the major performer with expenditures of $18 million for service related research and development and $9 million for electrical research and development.

5.7 Social Development and Related Areas

It is estimated that approximately $50 million was spent on research and development activities in the area of social development. This represented 9 percent of all research and development expenditures in Alberta. Universities accounted for essentially all of the research in this area (Table 5).

This area of application includes the sub-fields of culture, sport, recreation, education, human resources, and urban and regional studies.

6. PERSONNEL[1]

Only recently have consistent figures on the personnel component of research and development activities become available. However, data gathering remains hindered by some significant technical and conceptual problems, making accurate assessments difficult.

For comparative purposes, the unit of 'person-year' is used to indicate a full-time equivalent staff position engaged directly in research and development work. This allows an individual's time to be apportioned to different activity categories where that person is engaged in a variety of tasks, only some related to research and development.

Individuals engaged in research and development are classified either as 'professional and scientific personnel' or as 'technical and other support personnel'. (See Appendix B for definitions.)

6.1 Total Employment in Research and Development

The equivalent of 1 612 full-time persons were employed in a scientific or professional capacity engaged in research and development activities in the Province, not including the equivalent of 1 600 persons engaged in research in Alberta's universities. The equivalent of an additional 1 949 persons, excluding those at Alberta universities, were engaged on a full-time basis in a technical or other support capacity in an occupation related to research and development (Table 6).

---

[1] Figures in this section indicate full-time equivalents or 'person-years'. Because each individual may be engaged in a variety of tasks apart from those directly related to research and development, the actual number of people who were employed in an occupation related to research and development would be several times greater than the figures quoted here.

TABLE 6

PERSONNEL ENGAGED IN INTRAMURAL RESEARCH AND DEVELOPMENT IN ALBERTA AND CANADA 1982-83 (PERSON-YEARS)

Sector and Field Of Employment	Scientific And Professional		Technical and Other Support		Total	
	Alberta	Canada	Alberta	Canada	Alberta	Canada
Provincial Government						
Natural Sciences	150	..	180	..	330	..
Social Sciences	24	..	5	..	29	..
Total	174	1 500	185	2 030	359	3 530
Provincial Research Organizations	148	413	176	569	324	982
Federal Government						
Natural Sciences	335	5 374	698	10 699	1 033	16 073
Social Sciences	--	356	--	470	--	826
Total	335	5 730	698	11 169	1 033	16 899
Industry	955	15 900	890	17 080	1 845	32 980

Sources: Statistics Canada, Federal Scientific Establishments, 1982-83; Statistics Canada, "The Provincial Research Organizations 1982", Science Statistics, Vol. 7, #11; Statistics Canada, Scientific Activities of the Government of Alberta 1982-83 Survey Results; Statistics Canada, Science and Technology Statistics Division, estimates, April, 1984.

6.2 Provincial Government

The Alberta Government employed the equivalent of 174 scientific and professional persons during 1982-83, 150 of whom were engaged in natural sciences research. In addition, 148 scientific and professional persons were employed by the Alberta Research Council. The Provincial Government also employed the equivalent of 185 technical and other support persons, while the Alberta Research Council employed approximately 176 persons (Table 6).

The Alberta Government spent approximately $132 000 per professional researcher from its intramural research and development funds, up from $85 000 in 1981-82 (Table 7).

6.3 The Federal Government

In the 14 federal research establishments located in Alberta, the Federal Government employed 335 scientific and professional persons or 6 percent of those employed in federal research establishments across Canada. All of these persons were engaged in natural sciences research and development. An additional 698 persons were employed in technical or support capacities (Table 6).

The Federal Government spent $149 000 per professional research person in its establishments in Alberta, up from $139 000 in 1981-82. Nationally, the Federal Government spent $191 000 on each of its professional research staff across Canada (Table 7).

6.4 Industry

Industry in Alberta employed 955 full-time equivalent scientific and professional personnel during 1982-83, about 6 percent of the total across Canada. An additional 890 persons were employed in technical or support capacities (Table 6).

Alberta Industry spent $268 000 per professional research person, down from $366 000 in 1981-82, but still considerably greater than the Canadian average for Industry of $150 000 (Table 7).

TABLE 7

INTRAMURAL RESEARCH AND DEVELOPMENT
EXPENDITURES PER SCIENTIFIC AND PROFESSIONAL PERSONNEL
ALBERTA AND CANADA
1982-83

Sector and Field Of Employment	Intramural Research Expenditures		Scientific And Professional Personnel		Expenditure Per Professional Person	
	Alberta	Canada	Alberta	Canada	Alberta	Canada
	$ Millions	$ Millions	Person-Year	Person-Year	($'000)	($'000)
Provincial Government						
Natural Sciences	22	..	150	..	147	..
Social Sciences	1	..	24	..	42	..
Total	23	197	174	1 500	132	131
Federal Government						
Natural Sciences	50	1 042	335	5 374	149	194
Social Sciences	--	52	--	356	--	146
Total	50	1 094	335	5 730	149	191
Industry	256	2 381	955	15 900	268	150

Sources: Statistics Canada, Federal Scientific Establishments, 1982-83; Statistics Canada, Scientific Activities of the Government of Alberta 1982-83 Survey Results; Statistics Canada, Science and Technology Statistics Division, estimates, April, 1984.

6.5 Universities

In theory, each of the 4 500 academic staff members in Alberta's Universities is a scientific or professional person directly engaged in research activities. However, the instructional and community service obligations of the faculty restrict the amount of time which may be committed to research activities. The full-time equivalent figure for staff engaged solely in research activities is estimated to be approximately 1 600 person-years for all Alberta Universities.

SECTION II
SCIENTIFIC ACTIVITIES OF THE GOVERNMENT OF ALBERTA

1. INTRODUCTION

This section summarizes the major findings of the report, Scientific Activities of the Government of Alberta, 1982-83 Survey Results (Appendix A). This section also provides comparative data on the 1982-83 expenditures of the Provincial Governments of Ontario, British Columbia and Saskatchewan.

Scientific activities are those activities which involve the generation, dissemination and initial application of new scientific knowledge and technology. Included are both research and development activities and related scientific activities. Related scientific activities are activities ancillary to research and development, which do not include the acquisition of new knowledge. They do include such activities as scientific data collection, feasibility studies, operations and policy studies and educational support. Only the Federal Government and selected Provincial Governments collect expenditure data on related scientific activities.

2. TOTAL EXPENDITURES

A detailed description of the Alberta Government's expenditures on scientific activities for the year 1982-83 can be found in Appendix A. The following discussion highlights some of the important characteristics of these expenditures and draws comparisons with other Provincial Governments.

2.1 Alberta Government

Excluding the Heritage Foundation for Medical Research, the Alberta Government expended approximately $170 million on scientific and technological activities in 1982-83. This represented an increase of 14 percent over 1981-82 expenditures (Table 8).

2.2 Other Provincial Governments

From 1981-82 to 1982-83 scientific expenditures by the Ontario Government increased by $30 million (13 percent); the Saskatchewan Government's expenditures increased by $5 million (17 percent); and the British Columbia Government's expenditures increased by $1 million (1 percent) (Table 8).

TABLE 8

EXPENDITURES ON SCIENTIFIC ACTIVITIES OF SELECTED PROVINCIAL GOVERNMENTS AND THE FEDERAL GOVERNMENT 1982-83

Type of Scientific Activities	Governments $Millions (%)									
	Alberta		Ontario		Saskatchewan		British Columbia		Federal (in Canada)	
Natural Sciences										
Research and Development	115	(81)	100	(61)	12	(49)	24	(48)	1 655	(75)
Related Scientific Activities	28	(19)	64	(39)	12	(51)	26	(52)	552[e]	(25)
Total Scientific Activities	143	(84)	164	(64)	24	(70)	50	(68)	2 207[e]	(82)
Social Sciences										
Research and Development	2	(8)	22	(23)	--	(5)	1	(4)	95	(19)
Related Scientific Activities	25	(92)	72	(77)	10	(95)	23	(96)	405[e]	(81)
Total Scientific Activities	27	(16)	94	(36)	10	(30)	24	(32)	500[e]	(18)
Total										
Research and Development	118	(69)	122	(47)	12	(36)	25	(34)	1 750	(65)
Related Scientific Activities	53	(31)	136	(53)	22	(64)	49	(66)	957[e]	(35)
Total Scientific Activities	170	(100)	258	(100)	35	(100)	74	(100)	2 707[e]	(100)

Sources: Alberta Advanced Education, Planning Secretariat, estimates, July, 1984; Statistics Canada, Science and Technology Statistics Division, estimates, April 1984; Statistics Canada, annual surveys of scientific activities of participating provinces, 1982-83.

3. NATURAL SCIENCES AND SOCIAL SCIENCES EXPENDITURES

Although in 1982-83 the Alberta Government's expenditures for scientific activities increased by 14 percent over 1981-82 expenditures, the distribution remained approximately the same: 84 percent was expended for activities in the natural sciences, and 16 percent for activities in the social sciences. The comparable figures for the other provinces were: Ontario, 64 percent for the natural sciences, 36 percent for the social sciences; British Columbia, 68 percent for natural sciences, 32 percent for social sciences; Saskatchewan, 70 percent for natural sciences, 30 percent for social sciences (Table 8).

3.1 Alberta Government

In 1982-83, the Alberta Government's expenditures on natural sciences scientific activities were $143 million. This represented an increase of 16 percent over 1981-82 expenditures.

In 1982-83, the Alberta Government's expenditures on the social sciences scientific activities were $27 million. This represented an increase of 4 percent over 1981-82 expenditures.

3.2 Other Provincial Governments

In 1982-83, the Ontario Government's expenditures on natural sciences scientific activities were $164 million, an increase of 21 percent over 1981-82. British Columbia's expenditures were $50 million, unchanged from the previous year. Saskatchewan's expenditures were $24 million, an increase of 26 percent over the previous year.

In 1982-83, the Ontario Government's expenditures on social sciences were $94 million, an increase of 2 percent over 1981-82. British Columbia's expenditures were $24 million, a 3 percent increase over the previous year. Saskatchewan's expenditures were $10 million, unchanged since 1981-82.

4. RESEARCH AND DEVELOPMENT AND RELATED SCIENTIFIC ACTIVITIES

In 1982-83, approximately 69 percent of the Alberta Government's expenditures on scientific activities was directed toward research and development and 31 percent was directed toward related scientific activities. The comparable figures for Ontario were 47 percent for research and development, 53 percent for related scientific activities; for British Columbia, 34 percent for research and development, 66 percent for related scientific activities; for Saskatchewan, 36 percent for research and development and 64 percent for related scientific activities (Table 8).

4.1 Natural Sciences

Research and development expenditures accounted for 81 percent of total scientific expenditures by the Alberta Government in the natural sciences. The comparable figure for Ontario was 61 percent, for Saskatchewan 49 percent, and for British Columbia 48 percent.

4.2 Social Sciences[1]

Research and development expenditures accounted for 8 percent of total scientific expenditures by the Alberta Government in the social sciences. The comparable figure for Ontario was 23 percent, for Saskatchewan, 5 percent, and for British Columbia, 4 percent.

---

[1] Saskatchewan's research and development in the social sciences amounted to less than one half million dollars in 1982-83, or 5 percent of total scientific expenditures in the social sciences.

5. PERFORMERS

In 1982-83, the Provincial Governments of all four provinces were the primary performers of the scientific activities they funded. The Alberta Government, however, performed a proportionally smaller share of the total dollar value of scientific activities it funded than did other Provincial Governments (35 percent, as compared with a mean of 62 percent for the other provinces). Comparatively, Industry and the Provincial Research Council performed greater proportions of scientific activities funded by the Provincial Government than did these sectors in other provinces (Table 9).

5.1 Alberta Government

In 1982-83, the Alberta Government performed 35 percent of the total dollar value of scientific activities it funded. Other performers were, in declining order: Industry 26 percent; Alberta Research Council 19 percent; Universities 10 percent; Hospitals and Health Organizations 7 percent; and 'Others' 3 percent.

5.2 Other Provincial Governments

The comparable figures for the Ontario Government were: Intramural 60 percent; Industry 14 percent; Universities 17 percent; Hospitals and Health Organizations 4 percent; Ontario Research Foundation 2 percent; and 'Others' 3 percent.

The comparable figures for the British Columbia Government were: Intramural 71 percent; Industry 13 percent; Universities 7 percent; British Columbia Research Council 3 percent; 'Others' 6 percent; and Hospitals and Health Organizations less than 1 percent.

The comparable figures for the Saskatchewan Government were: Intramural 56 percent; Industry 10 percent; Universities 20 percent; Saskatchewan Research Council 11 percent; 'Others' 3 percent; and Hospitals and Health Organizations less than 1 percent.

TABLE 9

EXPENDITURES ON SCIENTIFIC ACTIVITIES OF SELECTED PROVINCIAL GOVERNMENTS BY PERFORMER 1982-83

Performer	Governments $Million (%)							
	Alberta		Ontario		Saskatchewan		British Columbia	
Intramural	60	(35)	154	(60)	19	(56)	53	(71)
Provincial Research Organization	32	(19)	4	(2)	4	(11)	2	(3)
Hospitals and Health Organi[illegible]ons	11	(7)	11	(4)	--	(--)	--	(--)
Industry	45	(26)	36	(14)	3	(10)	10	(13)
University	18	(10)	44	(17)	7	(20)	5	(7)
Others	5	(3)	9	(3)	1	(3)	4	(6)
Total	170	(100)	258	(100)	35	(100)	74	(100)

Sources: Statistics Canada, annual surveys of scientific activities of participating provinces, 1982-83.

6. APPLICATION

In 1982-83, Alberta expended substantially more for scientific activities in Energy and Fuels than in any other area of application. In comparison with other provinces, a smaller proportion of the Alberta Government's scientific expenditures was in the area of Social Development (Table 10).

6.1 Alberta

In 1982-83, approximately 30 percent of the Alberta Government's expenditures on scientific activities was in the area of Energy and Fuels. An additional 30 percent was expended on activities related to Industrial and Economic Development. In declining order, the other areas of expenditure were: Health 15 percent (again excluding the Heritage Foundation for Medical Research); Social Development 9 percent; Environmental Issues 7 percent; Advancement of Science 6 percent; and Transportation and Communications 5 percent.

6.2 Other Provincial Governments[1]

The comparable data, in declining order, for the Ontario Government in 1982-83 were: Industrial and Economic Development 33 percent; Social Development 20 percent; Environmental Issues 15 percent; Health 14 percent; Energy and Fuels 10 percent; Advancement of Science 5 percent; Transportation and Communications 3 percent.

The comparable data for the Saskatchewan Government in 1982-83 were: Industrial and Economic Development 42 percent; Health 19 percent; Social Development 19 percent; Energy and Fuels 7 percent; Environmental Issues 6 percent; and Transportation and Communications 5 percent.

---

[1] In 1982-83, social sciences expenditures were estimated by the British Columbia Government, and were not categorized by application area.

TABLE 10

EXPENDITURES ON SCIENTIFIC ACTIVITIES OF SELECTED PROVINCIAL GOVERNMENTS BY APPLICATION 1982-83

Application	Provincial Governments $ Millions (%)							
	Alberta		Ontario		Saskatchewan		British Columbia[1]	
	NSE	SSH	NSE	SSH	NSE	SSH	NSE	SSH
Advancement of Science	10 (7)	— (1)	1 (1)	12 (13)	— (1)	— (1)	1 (2)	..
Energy & Fuels	50 (35)	— (—)	25 (15)	1 (1)	2 (10)	— (—)	3 (6)	..
Environmental Issues	46 (32)	5 (17)	69 (42)	15 (16)	13 (54)	1 (14)	30 (59)	..
Health	12 (8)	— (2)	38 (23)	— (—)	2 (8)	— (1)	8 (15)	..
Industrial and Economic Development	21 (15)	4 (14)	21 (12)	16 (17)	5 (20)	2 (17)	4 (7)	..
Social Development and Related Areas	3 (2)	5 (18)	6 (4)	1 (1)	2 (7)	— (2)	1 (1)	..
Transportation and Communications	2 (1)	13 (47)	4 (2)	48 (51)	— (—)	7 (65)	4 (9)	..
Total	143 (100)	27 (100)	164 (100)	94 (100)	24 (100)	10 (100)	50 (100)	24 (100)

Source: Statistics Canada, annual surveys of scientific activities of participating provinces, 1982-83.

1 In 1982-83, social sciences expenditures were estimated by the British Columbia Government, and were not categorized by application area.

APPENDICES

Appendix A

SCIENTIFIC ACTIVITIES OF THE GOVERNMENT OF ALBERTA 1982-83 SURVEY RESULTS

A REPORT PREPARED BY:
THE SCIENCE AND TECHNOLOGY STATISTICS DIVISION,
STATISTICS CANADA
FEBRUARY, 1984.

FOREWORD

This report results from the tenth annual survey of scientific activities funded by the Government of Alberta. The survey was conducted in June of 1983 by Lloyd Lizotte of the Science and Technology Statistics Division with the co-operation and assistance of Asefa Gabregiorgis of Advanced Education and Manpower, Statistics Canada, and Onno DeVries of the Alberta Bureau of Statistics.

Scientific activities expenditures data of provincial governments provide an essential base for analysis and the formulation of provincial science policy. As increasing amounts are spent by these governments (Alberta expenditures have grown by almost 300% in the last six years), monitoring and guidance of science program become more important. They are also used to develop a national aggregate R&D series.

Other provinces taking part in these science surveys are Ontario, Saskatchewan and British Columbia. Reports for these provinces are available on request from the provincial department sponsoring the survey. National aggregates are published by Statistics Canada in the Canadian Science Indicators (Catalogue No. 88-201).

The 1982-83 survey has produced reasonable indicators of scientific involvement of the Alberta government at the department or agency level. This success is largely due to the goodwill and efforts of officials of the responding departments. It must be noted, however that 6 months elapsed between receipt of the questionnaires by departments and the receipt, at Statistics Canada, of the final response. Two agencies were unable to respond.

TABLE OF CONTENTS

	Page
Definitions	6
Summary	8
Indicators of Provincial Scientific Activities	15
List of Statistical Tables	22
Departmental Notes	119
The Respondents	124

The following symbols are used in this report:

- nil or zero

(e) estimated by Statistics Canada

.. figures not available

... figures not appropriate or not applicable

-- too small to be expressed

DEFINITIONS

This report covers those scientific and technological activities which involve the generation, dissemination and application of new scientific and technological knowledge. The central activity is research and experimental development (R&D). In addition, there are a number of related scientific activities (RSA) which are considered in less detail.

R&D is creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications.

It requires the acquistion of knowledge and not just information. New knowledge involves the integration of newly acquired information into existing hypotheses, the formulation and testing of new hypotheses or the re-evaluation of existing observations.

The major related scientific activities (RSA) are technical surveys, statistical surveys, information services, special services and studies, and museum services. Statistical surveys, information services and museum services are largely self-explanatory the other two are described below.

Technical surveys are activities directed towards the exploration and systematic description of the earth and its natural resources. The activities include the gathering, processing, collating and analyzing of data on natural phenomena except when part of a research project or a museum service. The preparation of maps and survey reports, their printing and cataloguing, are also included.

Special services and studies in the natural sciences are activities directed towards the establishment of national and provincial standards for materials, devices, products and processes; the calibration of secondary standards; non-routine quality testing; feasibility studies and demonstration projects. In the social sciences, special services and studies are systematic investigations carried out in order to provide information needed for planning or policy formulation, including feasibility studies, and demonstration projects.

DEFINITIONS
(concluded)

Five performing sectors are identified besides the Alberta Research Council. Intramural refers to the provincial ministry or agency performing a scientific activity. Industry consists principally of private corporations but also includes crown corporations with a commercial function (e.g., power utilities) and industrial research institutes not controlled by another sector.
Universities cover post secondary educational institutions and affiliated teaching and research facilities. Hospitals and health organizations are health organizations such as the Heart Foundation and hospitals which do not belong to the universities sector. Other includes non-resident performers of scientific activities funded by the provincial government, as well as recipients not covered elsewhere such as the Federal Government, other provincial ministries and individuals.

Natural Sciences are concerned with understanding, exploring, developing and utilizing the natural world. They include the life, physical, environmental, engineering and mathematical sciences.

Social Sciences and humanities involve the study of human actions and conditions and the social, economic and institutional mechanisms affecting humans. Disciplines included here are economics, psychology, sociology, history and urban and regional studies.

SUMMARY

R&D expenditures in 1982-83 have increased from 1981-82 by $16 million, or 17%. Major spenders are shown in Figure 1.

Total expenditures on science have increased as well, by $20 million or 13%.

Figure 1 CURRENT EXPENDITURES ON R&D, BY MAJOR DEPARTMENT, 1981-82 AND 1982-83

Major Department	1981-82	1982-83	Percentage change over 1981-82
	($'000)		%
Agriculture	10,978	13,699	25
Energy and Natural Resources	9,608	9,521	-1
Executive Council	15,500	19,148	23
AOSTRA	35,305	41,066	16
Hospitals and Medical Care	13,388	16,976	26
Sub-Total	84,779	100,410	18
Other	8,497	9,185	8
Total	93,276	109,595	17

TOTAL EXPENDITURES ON SCIENTIFIC ACTIVITIES, BY MAJOR DEPARTMENT, 1981-82 AND 1982-83

Major Department	1981-82	1982-83	Percentage change over 1981-82
	($'000)		%
Agriculture	14,978	16,391	9
Energy and Natural Resources	20,630	25,210	22
Environment	12,268	9,687	-21
Environmental Centre	7,441	10,528	41
AOSTRA	35,335	41,105	16
Hospitals and Medical Care	15,033	19,502	29
Sub-total	105,685	122,423	15
Other	44,417	48,017	8
Total	150,102	170,440	13

Most of Alberta's scientific activities are in the natural sciences. In 1982-83, 84% of total expenditures was spent on the natural sciences and 16% on the social sciences and humanities.

Figure II

TOTAL EXPENDITURES ON SCIENTIFIC ACTIVITIES,
BY SCIENCE TYPE, 1976-77 TO 1983-84

Science Type	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
				($'000)				
Natural	38,072	49,946	67,570	92,796	94,333	123,925	143,300	192,201
Social	12,260	14,069	14,124	16,742	19,383	26,177	27,140	30,006
Total	50,332	64,015	81,694	109,538	113,716	150,102	170,440	222,207

Figure III shows a large increase in R&D expenditures since 1976-77 most of it due to AOSTRA. In 1982-83 expenditure was $41 million with $71 million estimated for 1983-84. Another department with substantially increased R&D expenditures in natural sciences is Hospitals and Medical Care. It began in 1977-78 with a $2 million expenditure on medical R&D; that value has increased to $17 million and $19 million in 1982-83 and 1983-84 respectively.

Figure III CURRENT EXPENDITURES ON R&D IN THE NATURAL SCIENCES, 1976-77 TO 1983-84

Department	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
				($'000)				
AOSTRA	9,821	18,126	32,177	40,077	30,960	35,305	41,066	71,423
Hospitals and Medical Care	-	1,848	4,517	11,846	12,138	12,942	16,865	19,462
Other	18,409	20,690	20,835	26,230	32,335	42,301	49,431	58,608
Total R&D	28,230	40,664	57,529	78,153	75,433	90,548	107,362	149,493

Figure IV

TOTAL EXPENDITURES ON SCIENTIFIC ACTIVITIES,
BY SECTOR OF PERFORMANCE, 1982-83

Activity	Intramural	Industry	University	Hospitals and health organizations	Alberta Research Council	Other	Total
				($'000)			
R&D	23,340	32,606	16,420	11,191	31,184	2,884	117,625
RSA	36,185	11,998	1,453	-	1,170	2,009	52,815
Total	59,525	44,604	17,873	11,191	32,354	4,893	170,440

Most of the RSA funded by the provincial government are carried out by government establishments. However, only 20% of the R&D is performed by the government itself. Agriculture, Energy and Natural Resources, and the Environmental Centre are the major performers of scientific activities.

Industry is the major performing sector for government funded R&D. AOSTRA is the largest contributor to this sector in 1982-83, accounting for 62% or $28 million of the total $45 million expenditure.

The Department of Hospitals and Medical Care contributed $11 million to the hospitals and health organizations for medical research. It is also the largest funder of R&D in the universities.

The Alberta Research council received funds from seven departments in 1982-83. The largest source was the Executive Council for an amount of $19.1 million.

Figure V

TOTAL EXPENDITURES ON SCIENTIFIC ACTIVITIES, BY SOURCE OF FUNDS, 1982-83

	Departmental budget	Transfer from other departments	Trust fund	Other sources	Total
($'000)	108,295	636	47,626	13,883	170,440
%	64	--	28	8	100

The primary source of funds is the provincial departmental budgets, which fund 64% of total science expenditures. The Alberta Heritage Savings Trust Fund is the source of 92% of AOSTRA's science expenditures. In total, the Fund is the source of 28% of the 1982-83 science expenditure.

Other sources include the federal-provincial cost shared programs of $13.0 million.

Figure VI APPLICATION OF TOTAL EXPENDITURES IN THE NATURAL SCIENCES, 1982-83

Application	($'000)	%
Energy and fuels:		
Fossil fuels	46,296	32
Other	3,662	3
Environmental issues	11,964	8
Health	20,958	15
Industrial and economic development:		
Agriculture	19,622	14
Other	26,013	18
All other	14,785	10
Total	143,300	100

Under industrial and economic development, besides the $20 million spent on agriculture, $4 million is spent on forestry, $2 million on fisheries and $19 million on applications relating to industrial development.

Figure VII APPLICATION OF TOTAL EXPENDITURES IN THE SOCIAL SCIENCES, 1982-83

Application	($'000)	%
Industrial and economic development	4,660	17
Health	3,902	14
Social development and related areas:		
Education	5,003	19
Other	7,857	29
All other	5,718	21
Total	27,140	100

Departments were also requested to report personnel involved in departmental scientific activities. Results show that 50% of persons involved in scientific activities are scientists and engineers. Of the remaining employees, 31% are classed in the technical category and 19% as other supporting staff.

Figure VIII DEPARTMENTAL PERSONNEL ENGAGED IN INTRAMURAL ACTIVITIES, BY SCIENCE TYPE AND CATEGORY, 1982-83

Science type and activity	Scientific and professional	Technical	Other	Total
Natural sciences:				
R&D	150	130	50	330
RSA	167	170	74	411
Total	317	300	124	741
Social sciences:				
R&D	24	2	3	29
RSA	261	66	103	430
Total	285	68	106	459
Total	602	368	230	1,200

The Environmental Centre employ 29% of the total 741 people working in the natural sciences while 26% work in Energy and Natural Resources.

Indicators of Provincial Scientific Activities

1. Population and Income

Province	Population January 1983 (1)		Personal income per capita 1981 (2)		Provincial Gross Domestic Product per capita 1981 (3)	
	(000)	Rank	($)	Rank	($)	Rank
Newfoundland	576	9	7,528	10	7,253	9
Prince Edward Island	124	10	7,829	9	7,104	10
Nova Scotia	857	7	9,041	7	8,581	8
New Brunswick	706	8	8,272	8	8,798	7
Quebec	6,478	2	10,661	5	12,090	6
Ontario	8,754	1	12,386	3	14,848	3
Manitoba	1,042	5	10,806	6	12,265	5
Saskatchewan	991	6	11,583	4	15,042	4
Alberta	2,341	4	12,779	1	19,742	1
British Columbia	2,801	3	12,538	2	15,168	2
Canada (4)	24,740		11,520		13,920	

(1) Canadian Statistical Review, Statistics Canada, Catalogue No. 11-003E, March 1983.
(2) National Income and Expenditure Accounts, 1967-1981, Statistics Canada, Catalogue No. 13-201.
(3) Provincial Economic Accounts, Experimental Data, 1966-1981, Statistics Canada, Catalogue No. 13-213.
(4) Includes the Yukon and Northwest Territories.

2. Universities

Province	Graduate students per ten thousand population (15 years and over) 1981-82 (1)		Sponsored research in universities per capita, 1981-82 (2)	
		Rank	($'000)	Rank
Newfoundland	13	7	20	6
Prince Edward Island	-	10	1	10
Nova Scotia	26	4	21	5
New Brunswick	10	9	14	8
Quebec	28	2	22	4
Ontario	29	1	26	2
Manitoba	26	3	33	1
Saskatchewan	12	8	9	9
Alberta	22	5	24	3
British Columbia	20	6	18	7
Canada	25		23	

(1) Full-time enrolment for graduate degrees, per ten thousand population (15 years and over) Universities Enrolment and Degrees, 1981-82, Statistics Canada, Catalogue No. 81-204, and "Intercensal Estimates of Population by Sex and Age for Canada and the Provinces" June 1981, Population Estimates Section, Demography Division, Statistics Canada.

(2) Financial Statistics of Universities and Colleges, 1981-82, Canadian Association of University Business Officers.

3. Industry

Province	Value added by manufacturing industry per capita, 1980 (1)		Current intramural industrial R&D expenditures per employee in primary and secondary industry, 1981 (2)	
	($)	Rank	($)	Rank
Newfoundland	848	8	200	6
Prince Edward Island	633	10	--	10
Nova Scotia	1,394	7	66	8
New Brunswick	1,528	5	43	9
Quebec	2,834	2	570	3
Ontario	3,684	1	713	2
Manitoba	1,698	4	210	5
Saskatchewan	796	9	123	7
Alberta	1,442	6	847	1
British Columbia	2,345	3	221	4
Canada (3)	2,666		575	

(1) Manufacturing Industries of Canada; National and Provincial Areas, 1980, Statistics Canada, Catalogue No. 31-203.
(2) Results of 1981 Industrial R&D survey, Science and Technology Statistics Division, Statistics Canada and The Labour Force, April, 1983, Statistics Canada, Catalogue No. 71-001.
(3) Includes the Yukon and Northwest Territories.

4. Federal Government

Province	Expenditures on intramural natural science activities 1981-82 (1)	Federal personnel 1981-82 (1)	Contracts awarded by the Science Procurement Sector, Department of Supply and Services, 1982-83 (2)	
	($'000,000)	Person-years	No.	($'000,000)
Atlantic Provinces	120	2,351	584	16
Quebec	76 (3)	1,579 (3)	403	48
Ontario	196 (4)	4,614 (4)	1,285	96
Ottawa-Hull	520	9,850	...	...
Manitoba	82	1,542	123	5
Saskatchewan	30	691	73	6
Alberta	55	1,293	179	9
British Columbia	74	1,606	690	32
Canada (5)	1,153	23,539	3,357	212

(1) "Federal Scientific Establishments, 1981-82", Science and Technology Statistics Division, Statistics Canada.
(2) Research and Development Bulletin, April 1983, Supply and Services.
(3) Excluding Hull.
(4) Excluding Ottawa.
(5) Includes the Yukon and Northwest Territories.

5. Provincial Research Organizations

Province	Total expenditures on science and technology, 1982 (1)	
	($'000)	Rank
Nova Scotia	5,684	6
New Brunswick	5,207	7
Quebec	18,456	3
Ontario	19,802	2
Manitoba	4,765	8
Saskatchewan	10,247	4
Alberta	37,135	1
British Columbia	8,522	5
Total	109,818	

(1) "The Provincial Research Organizations, 1982", Science Statistics, Vol. 7, No. 11, Statistics Canada, Catalogue No. 88-001.

6. Sectors Performing R&D, by Region, 1981 (1)

Performing sector	Atlantic provinces	Quebec	Ontario	Alberta	Other Western provinces	Canada (2)
	($000,000)					
Federal government ...	83	88	513	46	134	865
Provincial government	3	18	37	13	15	85
Provincial research organizations	3	10	14	18	7	52
Total government	89	116	564	77	156	1,002
Industry	18	449	1,073	284	147	2,004
Universities	72	233	286	87	150	828
Private non-profit ...	-	13	12	1	3	30
All sectors	179	812	1,935	449	456	3,864

(1) Science and Technology Statistics Division, Statistics Canada.
(2) Includes the Yukon and Northwest Territories.
NOTE: Totals may not add due to rounding.

7. Sectors Funding R&D, by Region of Performance, 1981 (1)

Funding sector	Atlantic provinces	Quebec	Ontario	Alberta	Other Western provinces	Canada (2)
	($000,000)					
Federal government	112	216	750	80	205	1,368
Provincial government ..	7	66	86	66	36	258
Provincial research organizations	-	1	4	-	-	5
Total government	119	283	840	146	241	1,631
Industry	16	365	893	238	122	1,667
Universities	39	108	91	38	68	344
Private non-profit	2	22	36	4	12	76
Foreign	-	33	75	23	12	146
All sectors	179.	812	1,935	449	456	3,864

(1) Science and Technology Statistics Division, Statistics Canada.
(2) Includes the Yukon and Northwest Territories.
NOTE: Totals may not add due to rounding.

STATISTICAL TABLES

	Natural plus Social Sciences and Humanities		Natural Sciences		Social Sciences and Humanities	
	Table	Page	Table	Page	Table	Page
Historical Tables						
Total Expenditures:						
by Activity, 1976-77 to 1983-84	1	27	21	66	41	92
by Department, 1976-77 to 1983-84	2	28	22	67	42	93
by Performer, 1976-77 to 1983-84	3	30	23	68	43	95
Current Expenditures on R&D:						
by Performer, 1976-77 to 1983-84	4	31	24	69	44	96
by Department, 1976-77 to 1983-84	5	32	25	70	45	97
Current Fiscal-year Tables (1982-83)						
Total Expenditures						
by Sources of Funds	6	34	26	71	46	99
by Activity and Performer	7	36	27	72	47	100
by Department and Performer	9	38	29	74	49	102
Current Expenditures on R&D :						
Department and Performer	11	42	31	76	51	104
Application of Expenditures:						
by Department	13	44	33	78	53	106
by Application and Activity	15	56	35	84	55	112

STATISTICAL TABLES
(concluded)

Extramural R&D Expenditures by Sector of Performance and Application	17	58	37	86	57	114
Departmental Personnel Engaged in Intramural Activities	19	60	39	88	59	116
Estimate Fiscal-year Tables (1983-84)						
Total Expenditures:						
by Activity and Performer	8	37	28	73	48	101
by Department and Performer	10	40	30	75	50	103
Current Expenditures on R&D : Department and Performer	12	43	32	77	52	105
Application of Expenditures:						
by Department	14	50	34	81	54	109
by Application and Activity	16	57	36	85	56	113
Extramural R&D Expenditures by Sector of Performance and Application	18	59	38	87	58	115
Departmental Personnel Engaged in Intramural Activities	20	62	40	89	60	117

Natural plus Social Sciences and Humanities

TABLE 1. Total Expenditures, by Activity, 1976-77 to 1983-84

Government of Alberta

Activity	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Research and development:								
Current expenditures:								
In-house	4,817	3,971	2,745	5,838	7,748	12,248	15,257	16,796
Contracts	12,920	20,490	38,018	48,722	39,734	47,196	51,992	88,825
Grants	13,022	18,119	19,734	27,294	30,704	33,561	42,040	46,007
Research fellowships	50	152	112	202	112	271	306	326
Sub-total	30,809	42,732	60,609	82,056	78,298	94,209	109,595	151,954
Capital expenditures	148	592	2,384	1,384	1,421	1,932	8,030	14,667
Related scientific activities:								
Current expenditures	19,268	20,561	18,441	25,488	33,277	53,143	50,815	53,728
Capital expenditures	107	130	260	610	720	1,751	2,000	1,858
Total	50,332	64,015	81,694	109,538	113,716	150,102	170,440	222,207

Government of Alberta

TABLE 2. Total Expenditures, by Department or Agency, 1976-77 to 1983-84

Department or Agency	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84p
	($'000)							
Advanced Education & Manpower	763	834	2,408	2,075	1,920	2,344	2,417	1,245
Agricultural Research Trust ..	...	...	461	472	389	395	373	394
Agriculture	3,754(e)	3,750	3,500	4,656	7,130	14,978	16,391	19,900
Alcoholism & Drug Abuse Commission	...	232	248	282	375	497	264	319
Attorney General	357	299	238	260	290	290	290	200
Business Development & Tourism	8,026	10,766	...	...	...	...	...	...
Consumer & Corporate Affairs .	90	90	62	75	89	120	143	148
Culture	3,162	3,162(e)	2,111	2,419	2,239	3,318(e)	2,833	3,020
Economic Development	...	...	2,117	3,125	3,484	5,857	4,093	4,100
Education	1,723	1,450	1,932	2,114	2,414	3,050	3,617(e)	3,617(e)
Educational Communications Corporation ACCESS	130	-	263	215	185	182(e)	200(e)	220(e)
Energy & Natural Resources ...	6,176	5,185	9,140	12,819	14,274	20,630	25,210	35,880
Environment	7,782	8,634	5,886	10,911	11,902	12,268	9,687	9,730
Environmental Centre	...	...	...	-	3,168	7,441	10,528	11,300
Environment Conservation Authority	792	...	...	...	...	...	...	...
Environment Council	...	--	292	252	555	399	352	433
Executive Council	...	...	8,209	9,153	11,561	15,500	19,148	19,950
Health Care Insurance Commission	109	...	...	...	...	...	...	...
Hospital Services Commission .	881	...	...	...	...	...	...	...
Hospitals & Medical Care	...	3,205	5,659	12,876	13,930	15,033	19,502	22,741
Housing & Public Works	665	975	390	420	324	480	805	965

TABLE 2. Total Expenditures, by Department or Agency, 1976-77 to 1983-84 - Concluded

Government of Alberta

Department or Agency	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84p
	($'000)							
Labour	260	219	266	379	353	462	557	723
Manpower	...	...	...	...	...	...	...	1,804
Mental Health Research Fund	...	...	182	230	478	360	386	386
Municipal Affairs	331	125	399	258	364	372	321	400
AOSTRA	10,132	18,737	32,746	40,195	30,988	35,335	41,105	71,478
Recreation & Parks	...	...	--	580	578	910	940	757
Recreation, Parks & Wildlife	1,171	1,171 (e)	...	...	...	...	...	...
Social Services & Community Health	705 (e)	725	535	630	733	933	100	...
Solicitor General	114	267	257	35	183	1,754	3,478	4,600
Tourism & Small Business	...	...	517	1,046	1,451	1,248	1,597	1,540
Transportation	1,155	2,564	1,888	1,811	1,932	3,050	3,262	3,308
Treasury	2,026	1,625	1,161	1,426	1,868	2,085	1,994	2,138
Workers' Compensation Board	28	-	165	-	-	-	-	-
Workers' Health, Safety & Compensation	...	...	662	824	579	813	847	911
Total	50,332	64,015	81,694	109,538	113,716	150,102	170,440	222,207

Government of Alberta

TABLE 3. Total Expenditures, by Performer, 1976-77 to 1983-84

Performer	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Intramural	19,146	17,835	18,388	25,867	28,298	51,515	59,525	69,285
Industry	13,722	26,146	37,779	47,011	41,000	42,974	44,804	78,343
Universities	2,274	2,138	5,408	6,891	8,076	10,139	17,873	18,304
Hospitals and health organizations	(1)	2,653	5,218	12,330	12,321	12,801	11,191	15,833
Alberta Research Council (2)	10,474	10,741	12,874	14,009	20,589	27,750	32,354	34,570
Other	4,716	4,502	2,029	3,330	3,432	4,923	4,893	9,272
Total	50,332	64,015	81,694	109,538	113,716	150,102	170,440	222,207

(1) Before 1977-78, Hospitals and health organizations were included in Other performers.
(2) Annual funding by the Government of Alberta - other funds are not included.

Government of Alberta

TABLE 4. Current Expenditures on R&D, by Performer, 1976-77 to 1983-84

Performer	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Intramural	5,609	4,227	3,983	6,366	7,885	12,300	15,310	16,902
Industry	12,286	21,228	34,396	42,141	28,923	28,946	32,606	83,815
Universities	1,769	1,931	4,253	6,001	7,043	9,089	16,420	15,059
Hospitals and health organizations	(1)	1,978	4,785	12,075	12,316	12,801	11,191	15,785
Alberta Research Council (2)	8,704	10,188	12,175	12,837	19,567	26,684	31,184	33,253
Other	2,441	3,180	1,017	2,636	2,564	3,456	2,884	7,140
Total	30,809	42,732	60,609	82,056	78,298	93,276	109,595	151,954

(1) Before 1977-78, Hospitals and health organizations were included in Other performers.
(2) Annual funding by the Government of Alberta - other funds are not included.

Government of Alberta

TABLE 5. Current Expenditures on R&D, by Department or Agency, 1976-77 to 1983-84

Department or Agency	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Advanced Education & Manpower	56	-	320	550	-	-	-	-
Agricultural Research Trust ..	...	...	461	472	389	395	373	394
Agriculture	2,351(e)	3,750	3,500	4,656	7,130	10,978	13,699	16,300
Alcoholism & Drug Abuse Commission	...	-	57	93	118	7	7	7
Attorney General	225	219	238	260	290	290	290	200
Business Development & Tourism	7,702	7,534	...	...	...	...	...	...
Consumer & Corporate Affairs .	54	45	-	-	-	-	-	-
Culture	261	261(e)	345	536	377	594(e)	296	324
Education	982	1,020	1,203	1,137	438	381	285(e)	285(e)
Educational Communications Corporation ACCESS	-	-	-	5	5	8(e)	7(e)	8(e)
Energy & Natural Resources ...	4,476	3,669	4,739	6,193	7,390	9,608	9,521	14,883
Environment	3,235	3,864	2,836	4,811	3,521	3,259	3,481	3,637
Environmental Centre	...	...	...	-	1,300	2,157	2,997	3,329
Environment Council	...	...	97	186	435	314	278	348
Executive Council	...	...	8,209	9,153	11,561	15,500	19,148	19,950
Hospital Services Commission .	127	...	...	...	...	...	...	...
Hospitals & Medical Care	...	1,984	4,661	12,073	12,281	13,388	16,976	19,573
Housing & Public Works	34	-	-	-	37	100	385	485

Government of Alberta

TABLE 5. Current Expenditures on R&D by Department or Agency, 1976-77 to 1983-84 - Concluded

Department or Agency	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Mental Health Research Fund ..	...	...	182	216	478	360	386	386
Municipal Affairs	130	102	322	166	220	254	321	400
AOSTRA	9,821	18,126	32,177	40,077	30,960	35,305	41,066	71,423
Recreation & Parks	...	...	--	-	-	-	-	-
Recreation, Parks & Wildlife	449	449(e)	...	...	...	...	...	...
Social Services & Community Health	280(e)	308	76	84	93	-	-	...
Solicitor General	101	-	-	35	24	-	-	-
Tourism & Small Business	...	...	-	-	79	-	-	-
Transportation	513	1,181	998	1,131	952	272	13	10
Treasury	-	220	35	48	203	61	-	-
Workers' Compensation Board ..	12	-	36	-	-	-	-	-
Workers' Health, Safety & Compensation	...	-	117	174	17	47	68	112
Total	30,809	42,732	60,609	82,056	78,298	93,276	109,595	151,954

Government of Alberta

TABLE 8. Total Expenditures, by Sources of Funds, 1982-83

Department or Agency	Departmental budget	Transfers from other departments	Transfers from federal government	Trust funds	Other sources	Total
	($'000)					
Advanced Education & Manpower	2,417	-	-	-	-	2,417
Agricultural Research Trust ..	-	250	-	-	123	373
Agriculture	10,456	-	-	5,935	-	16,391
Alcoholism & Drug Abuse Commission	264	-	-	-	-	264
Attorney General	290	-	-	-	-	290
Consumer & Corporate Affairs .	133	-	-	-	10	143
Culture	2,813	-	20	-	-	2,833
Economic Development	4,093	-	-	-	-	4,093
Education	3,360	-	257	-	-	3,617 (e)
Educational Communications Corporation ACCESS	200	-	-	-	-	200 (e)
Energy & Natural Resources ...	12,195	-	-	-	13,015	25,210
Environment	9,170	-	-	517	-	9,687
Environmental Centre	10,528	-	-	-	-	10,528
Environment Council	352	-	-	-	-	352
Executive Council	19,148	-	-	-	-	19,148
Hospitals & Medical Care	16,568	-	-	2,934	-	19,502
Housing & Public Works	805	-	-	-	-	805

Government of Alberta

TABLE 6. Total Expenditures, by Sources of Funds, 1982-83 - Concluded

Department or Agency	Departmental budget	Transfers from other departments	Transfers from federal government	Trust funds	Other sources	Total
	($'000)					
Labour	557	-	-	-	-	557
Mental Health Research Fund	-	386	-	-	-	386
Municipal Affairs	321	-	-	-	-	321
AOSTRA	3,100	-	-	38,005	-	41,105
Recreation & Parks	940	-	-	-	-	940
Social Services & Community Health	100	-	-	-	-	100
Solicitor General	3,478	-	-	-	-	3,478
Tourism & Small Business	1,597	-	-	-	-	1,597
Transportation	3,262	-	-	-	-	3,262
Treasury	1,994	-	-	-	-	1,994
Workers' Health, Safety & Compensation	154	-	-	235	458	847
Total	108,295	636	277	47,626	13,606	170,440

Government of Alberta

TABLE 7. Total Expenditures by Activity and Performer, 1982-83

Activity	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Research and development:							
Current expenditures:							
In-house	15,257	...	...	...	...	...	15,257
Contracts	53	32,236	5,203	-	12,036	2,469	51,992
Grants	-	370	10,911	11,191	19,148	415	42,040
Research fellowships	-	-	306	-	-	-	306
Sub-total	15,310	32,606	16,420	11,191	31,184	2,884	109,595
Capital expenditures	8,030	...	...	...	...	...	8,030
Related scientific activities:							
Current expenditures	34,185	11,998	1,453	-	1,170	2,009	50,815
Capital expenditures	2,000	...	...	...	...	...	2,000
Total	59,525	44,604	17,873	11,191	32,354	4,893	170,440

Government of Alberta

TABLE 8. Total Expenditures by Activity and Performer, 1983-84

Activity	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Research and development:							
Current expenditures:							
In-house	16,796	...	...	...	...	...	16,796
Contracts	106	63,345	5,066	-	13,298	7,010	88,825
Grants	-	470	9,867	15,785	19,955	130	46,007
Research fellowships	-	-	326	-	-	-	326
Sub-total	16,902	63,815	15,059	15,785	33,253	7,140	151,954
Capital expenditures	14,667	...	...	...	...	...	14,667
Related scientific activities:							
Current expenditures	36,458	12,528	1,245	48	1,317	2,132	53,728
Capital expenditures	1,858	...	...	...	...	...	1,858
Total	69,885	76,343	16,304	15,833	34,570	9,272	222,207

Government of Alberta

TABLE 9. Total Expenditures by Department or Agency and Performer, 1982-83

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Advanced Education & Manpower	1,302	122	891	-	-	102	2,417
Agricultural Research Trust ..	23	-	350	-	-	-	373
Agriculture	7,100	418	3,172	-	3,664	2,037	16,391
Alcoholism & Drug Abuse Commission	194	63	7	-	-	-	264
Attorney General	-	-	290	-	-	-	290
Consumer & Corporate Affairs .	143	-	-	-	-	-	143
Culture	2,685	107	41	-	-	-	2,833
Economic Development	2,000	2,093	-	-	-	-	4,093
Education	900	1,752	150	-	5	810	3,617 (e)
Educational Communications Corporation ACCESS	180	-	-	-	-	20	200 (e)
Energy & Natural Resources ...	16,584	3,419	1,299	-	3,889	19	25,210
Environment	5,359	3,119	707	-	489	13	9,687
Environmental Centre	10,498	-	-	-	-	30	10,528
Environment Council	316	36	-	-	-	-	352
Executive Council	-	-	-	-	19,148	-	19,148
Hospitals & Medical Care	2,088	240	5,985	11,191	-	-	19,502
Housing & Public Works	280	495	-	-	-	30	805

Government of Alberta

TABLE 9. Total Expenditures by Department or Agency and Performer, 1982-83 - Concluded

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Labour	555	2	-	-	-	-	557
Mental Health Research Fund	-	-	386	-	-	-	386
Municipal Affairs	321	-	-	-	-	-	321
AOSTRA	3,100	28,029	4,526	-	4,772	678	41,105
Recreation & Parks	627	313	-	-	-	-	940
Social Services & Community Health	-	100	-	-	-	-	100
Solicitor General	922	2,556	-	-	-	-	3,478
Tourism & Small Business	848	904	-	-	-	45	1,597
Transportation	1,048	716	-	-	387	1,109	3,262
Treasury	1,994	-	-	-	-	-	1,994
Workers' Health, Safety & Compensation	660	118	69	-	-	-	847
Total	59,525	44,604	17,873	11,191	32,354	4,893	170,440

Government of Alberta

TABLE 10. Total Expenditures, by Department or Agency and Performer, 1983-84

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Advanced Education	277	33	935	-	-	-	1,245
Agricultural Research Trust ..	24	-	370	-	-	-	394
Agriculture	8,600	800	4,000	-	4,000	2,500	19,900
Alcoholism & Drug Abuse Commission	249	63	7	-	-	-	319
Attorney General	-	-	200	-	-	-	200
Consumer & Corporate Affairs .	148	-	-	-	-	-	148
Culture	2,858	117	45	-	-	-	3,020
Economic Development	2,000	2,100	-	-	-	-	4,100
Education	900	1,752	150	-	5	810	3,617 (e)
Educational Communications Corporation ACCESS	198	-	-	-	-	22	220 (e)
Energy & Natural Resources ...	21,998	7,819	1,234	-	4,819	10	35,880
Environment	5,322	3,265	734	-	409	-	9,730
Environmental Centre	11,300	-	-	-	-	-	11,300
Environment Council	353	80	-	-	-	-	405
Executive Council	-	-	-	-	19,950	-	19,950
Hospitals & Medical Care	3,120	-	3,788	15,833	-	-	22,741
Housing & Public Works	280	655	-	-	-	30	965

Government of Alberta

TABLE 10. Total Expenditures, by Department or Agency and Performer, 1983-84 - Concluded

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Labour	595	-	-	-	-	128	723
Manpower	1,604	200	-	-	-	-	1,804
Mental Health Research Fund	-	-	386	-	-	-	386
Municipal Affairs	400	-	-	-	-	-	400
AOSTRA	3,478	54,295	4,330	-	4,875	4,500	71,478
Recreation & Parks	477	280	-	-	-	-	757
Solicitor General	1,087	3,513	-	-	-	-	4,600
Tourism & Small Business	750	740	-	-	-	50	1,540
Transportation	1,088	508	-	-	512	1,222	3,308
Treasury	2,138	-	-	-	-	-	2,138
Workers' Health, Safety & Compensation	661	125	125	-	-	-	911
Total	69,885	76,343	16,304	15,833	34,570	9,272	222,207

Government of Alberta

TABLE 11. Current Expenditures on R&D, by Department or Agency and Performer, 1982-83

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Agricultural Research Trust ..	23	-	350	-	-	-	373
Agriculture	4,408	418	3,172	-	3,664	2,037	13,699
Alcoholism & Drug Abuse Commission	-	-	7	-	-	-	7
Attorney General	-	-	290	-	-	-	290
Culture	148	107	41	-	-	-	296
Education	80	50	50	-	5	100	285(e)
Educational Communications Corporation ACCESS	7	-	-	-	-	-	7(e)
Energy & Natural Resources ...	2,223	3,013	1,173	-	3,103	9	9,521
Environment	1,828	588	578	-	489	-	3,481
Environmental Centre	2,967	-	-	-	-	30	2,997
Environment Council	240	36	-	-	-	-	276
Executive Council	-	-	-	-	19,148	-	19,148
Hospitals & Medical Care	-	-	5,785	11,191	-	-	16,976
Housing & Public Works	-	355	-	-	-	30	385
Mental Health Research Fund ..	-	-	386	-	-	-	386
Municipal Affairs	321	-	-	-	-	-	321
AOSTRA	3,061	28,029	4,526	-	4,772	678	41,066
Transportation	-	10	-	-	3	-	13
Workers' Health, Safety & Compensation	6	-	62	-	-	-	68
Total	15,310	32,606	16,420	11,191	31,184	2,884	109,595

Government of Alberta

TABLE 12. Current Expenditures on R&D by Department or Agency and Performer, 1983-84

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Agricultural Research Trust ..	24	-	370	-	-	-	394
Agriculture	5,000	800	4,000	-	4,000	2,500	16,300
Alcoholism & Drug Abuse Commission	-	-	7	-	-	-	7
Attorney General	-	-	200	-	-	-	200
Culture	162	117	45	-	-	-	324
Education	80	50	50	-	5	100	285 (e)
Educational Communications Corporation ACCESS	8	-	-	-	-	-	8 (e)
Energy & Natural Resources ...	2,221	7,454	1,184	-	4,014	10	14,883
Environment	1,975	554	599	-	409	-	3,537
Environmental Centre	3,329	-	-	-		-	3,329
Environment Council	268	80	-	-		-	348
Executive Council	-	-	-	-	19,95	-	19,950
Hospitals & Medical Care	-	-	3,788	15,785	-	-	19,573
Housing & Public Works	-	455	-	-	-	30	485
Mental Health Research Fund ..	-	-	386	-	-	-	386
Municipal Affairs	400	-	-	-	-	-	400
AOSTRA	3,423	54,295	4,330	-	4,875	4,500	71,423
Transportation	-	10	-	-	-	-	10
Workers' Health, Safety & Compensation	12	-	100	-	-	-	112
Total	16,902	63,815	15,059	15,785	33,253	7,140	151,954

Government of Alberta

TABLE 13. Application of Expenditures, by Department or Agency, 1982-83

Department or Agency	Advancement of science	Communi-cations	Energy and fuels		Environmental issues
			Fossil fuels	Other	
	($'000)				
Advanced Education & Manpower	-	-	-	-	-
Agricultural Research Trust ..	-	-	-	-	-
Agriculture	-	-	-	-	-
Alcoholism & Drug Abuse Commission	-	-	-	-	-
Attorney General	-	-	-	-	-
Consumer & Corporate Affairs .	-	-	-	-	-
Culture	255	-	-	-	-
Economic Development	-	-	-	-	-
Education	-	-	-	-	-
Educational Communications Corporation ACCESS	-	-	-	-	-
Energy & Natural Resources ...	-	-	13,824	562	-
Environment	505	-	189	-	5,889
Environmental Centre	-	-	129	-	3,020
Environment Council	-	-	-	-	352
Executive Council	-	-	3,447	-	3,255
Hospitals & Medical Care	-	-	-	-	-
Housing & Public Works	-	-	-	-	-

TABLE 13. Application of Expenditures by Department or Agency, 1982-83 - Continued

Government of Alberta

Department or Agency	Advancement of science	Communi-cations	Energy and fuels		Environmental issues
			Fossil fuels	Other	
	($'000)				
Labour	-	-	-	-	-
Mental Health Research Fund	-	-	-	-	-
Municipal Affairs	-	-	-	-	-
AOSTRA	9,298	-	28,707	3,100	-
Recreation & Parks	-	-	-	-	-
Social Services & Community Health	-	-	-	-	100
Solicitor General	-	3,208	-	-	-
Tourism & Small Business	-	-	-	-	125
Transportation	-	-	-	-	-
Treasury	-	-	-	-	-
Workers' Health, Safety & Compensation	-	-	-	-	-
Total	10,058	3,208	46,296	3,662	12,541

Government of Alberta

TABLE 13. Application of Expenditures by Department or Agency, 1982-83 - Continued

Department or Agency	Health	Industrial and economic development					
		Agriculture	Fisheries	Forestry	Manufac-turing	Minerals	Other
	($'000)						
Advanced Education & Manpower	-	-	-	-	-	-	-
Agricultural Research Trust ..	-	373	-	-	-	-	-
Agriculture	-	16,391	-	-	-	-	-
Alcoholism & Drug Abuse Commission	264	-	-	-	-	-	-
Attorney General	-	-	-	-	-	-	-
Consumer & Corporate Affairs .	-	-	-	-	-	-	-
Culture	-	-	-	-	-	-	-
Economic Development	-	-	-	474	1,480	35	426
Education	-	-	-	-	-	-	-
Educational Communications Corporation ACCESS	-	-	-	-	-	-	-
Energy & Natural Resources ...	-	75	2,066	4,352	-	897	3,634
Environment	95	102	-	-	-	-	3,008
Environmental Centre	3,766	2,681	129	129	-	-	-
Environment Council	-	-	-	-	-	-	-
Executive Council	-	-	-	-	-	-	12,446
Hospitals & Medical Care	19,502	-	-	-	-	-	-
Housing & Public Works	-	-	-	-	-	-	485

TABLE 13. Application of Expenditures by Department or Agency, 1982-83 - Continued

Government of Alberta

Department or Agency	Health	Industrial and economic development					
		Agriculture	Fisheries	Forestry	Manufac-turing	Minerals	Other
	($'000)						
Labour	-	-	-	-	-	-	-
Mental Health Research Fund	386	-	-	-	-	-	-
Municipal Affairs	-	-	-	-	-	-	-
AOSTRA	-	-	-	-	-	-	-
Recreation & Parks	-	-	-	-	-	-	-
Social Services & Community Health	-	-	-	-	-	-	-
Solicitor General	-	-	-	-	-	-	-
Tourism & Small Business	-	-	-	-	-	-	-
Transportation	-	-	-	-	50	-	1,282
Treasury	-	-	-	-	-	-	-
Workers' Health, Safety & Compensation	847	-	-	-	-	-	-
Total	24,860	19,622	2,195	4,995	1,530	732	21,281

Government of Alberta

TABLE 13. Application of Expenditures by Department or Agency, 1982-83 - Continued

Department or Agency	Social development and related areas					Transportation	Total
	Culture, sport and recreation	Education	Human resources	Urban and regional studies	Other		
	($'000)						
Advanced Education & Manpower	-	1,186	1,231	-	-	-	2,417
Agricultural Research Trust ..	-	-	-	-	-	-	373
Agriculture	-	-	-	-	-	-	16,391
Alcoholism & Drug Abuse Commission	-	-	-	-	-	-	264
Attorney General	-	-	-	-	290	-	290
Consumer & Corporate Affairs .	-	-	-	-	143	-	143
Culture	2,578	-	-	-	-	-	2,833
Economic Development	-	-	-	-	-	1,678	4,093
Education	-	3,617	-	-	-	-	3,617 (e)
Educational Communications Corporation ACCESS	-	200	-	-	-	-	200 (e)
Energy & Natural Resources ...	-	-	-	-	-	-	25,210
Environment	-	-	-	99	-	-	9,887
Environmental Centre	674	-	-	-	-	-	10,528
Environment Council	-	-	-	-	-	-	352
Executive Council	-	-	-	-	-	-	19,148
Hospitals & Medical Care	-	-	-	-	-	-	19,502
Housing & Public Works	-	-	-	320	-	-	805

Government of Alberta

TABLE 13. Application of Expenditures by Department or Agency, 1982-83 - Concluded

Department or Agency	Social development and related areas					Transportation	Total
	Culture, sport and recreation	Education	Human resources	Urban and regional studies	Other		
	($'000)						
Labour	-	-	557	-	-	-	557
Mental Health Research Fund	-	-	-	-	-	-	388
Municipal Affairs	-	-	-	321	-	-	321
AOSTRA	-	-	-	-	-	-	41,105
Recreation & Parks	940	-	-	-	-	-	940
Social Services & Community Health	-	-	-	-	-	-	100
Solicitor General	-	-	-	-	270	-	3,478
Tourism & Small Business	-	-	25	135	-	-	1,597
Transportation	-	-	-	-	-	3,262	3,262
Treasury	-	-	-	-	1,994	-	1,994
Workers' Health, Safety & Compensation	-	-	-	-	-	-	847
Total	4,192	5,003	1,813	875	2,697	4,940	170,440

Government of Alberta

TABLE 14. Application of Expenditures by Department or Agency, 1983-84

Department or Agency	Advancement of science	Communi-cations	Energy and fuels			Environmental issues
			Fossil fuels	Nuclear energy	Other	
	($'000)					
Advanced Education	-	-	-	-	-	-
Agricultural Research Trust	-	-	-	-	-	-
Agriculture	-	-	-	-	-	-
Alcoholism & Drug Abuse Commission	-	-	-	-	-	-
Attorney General	-	-	-	-	-	-
Consumer & Corporate Affairs	-	-	-	-	-	-
Culture	279	-	-	-	-	-
Economic Development	-	-	-	-	-	-
Education	-	-	-	-	-	-
Educational Communications Corporation ACCESS	-	-	-	-	-	-
Energy & Natural Resources	-	-	24,136	147	2,171	-
Environment	505	-	190	-	-	5,724
Environmental Centre	-	-	138	-	-	3,241
Environment Council	-	-	-	-	-	433
Executive Council	-	-	3,591	-	-	3,392
Hospitals & Medical Care	-	-	-	-	-	-
Housing & Public Works	-	-	-	-	-	-

TABLE 14. Application of Expenditures by Department or Agency, 1983-84 - continued

Government of Alberta

Department or Agency	Advancement of science	Communi-cations	Energy and fuels			Environmental issues
			Fossil fuels	Nuclear energy	Other	
	($'000)					
Labour	-	-	-	-	-	-
Manpower	-	-	-	-	-	-
Mental Health Research Fund	-	-	-	-	-	-
Municipal Affairs	-	-	-	-	-	-
AOSTRA	9,205	-	58,795	-	3,478	-
Recreation & Parks	-	-	-	-	-	-
Social Services & Community Health	-	-	-	-	-	-
Solicitor General	-	4,315	-	-	-	-
Tourism & Small Business	-	-	-	-	-	-
Transportation	-	-	-	-	-	-
Treasury	-	-	-	-	-	-
Workers' Health, Safety & Compensation	-	-	-	-	-	-
Total	9,989	4,315	86,850	147	5,649	12,790

Government of Alberta

TABLE 14. Application of Expenditures by Department or Agency, 1983-84 - continued

Department or Agency	Health	Industrial and economic development					
		Agriculture	Fisheries	Forestry	Manufac-turing	Minerals	Other
	($'000)						
Advanced Education	-	-	-	-	-	-	-
Agricultural Research Trust ..	-	394	-	-	-	-	-
Agriculture	-	19,900	-	-	-	-	-
Alcoholism & Drug Abuse Commission	319	-	-	-	-	-	-
Attorney General	-	-	-	-	-	-	-
Consumer & Corporate Affairs .	-	-	-	-	-	-	-
Culture	-	-	-	-	-	-	-
Economic Development	-	-	-	480	1,480	-	450
Education	-	-	-	-	-	-	-
Educational Communications Corporation ACCESS	-	-	-	-	-	-	-
Energy & Natural Resources ...	-	127	1,622	3,991	-	805	3,226
Environment	45	124	-	-	-	-	2,698
Environmental Centre	4,045	2,878	138	138	-	-	-
Environment Council	-	-	-	-	-	-	-
Executive Council	-	-	-	-	-	-	12,967
Hospitals & Medical Care	22,741	-	-	-	-	-	-
Housing & Public Works	-	-	-	-	-	-	585

TABLE 14. Application of Expenditures by Department or Agency, 1983-84 - continued

Government of Alberta

Department or Agency	Health	Industrial and economic development					
		Agriculture	Fisheries	Forestry	Manufac-turing	Minerals	Other
	($'000)						
Labour	-	-	-	-	-	-	-
Manpower	-	-	-	-	-	-	-
Mental Health Research Fund	386	-	-	-	-	-	-
Municipal Affairs	-	-	-	-	-	-	-
AOSTRA	-	-	-	-	-	-	-
Recreation & Parks	-	-	-	-	-	-	-
Social Services & Community Health	-	-	-	-	-	-	-
Solicitor General	-	-	-	-	-	-	-
Tourism & Small Business	120	-	-	-	70	-	1,175
Transportation	-	-	-	-	-	-	-
Treasury	-	-	-	-	-	-	-
Workers' Health, Safety & Compensation	911	-	-	-	-	-	-
Total	28,567	23,423	1,760	4,609	1,550	805	21,101

Government of Alberta

TABLE 14. Application of Expenditures by Department or Agency, 1983-84 - continued

Department or Agency	Social development and related areas					Transportation	Total
	Culture, sport and recreation	Education	Human resources	Urban and regional studies	Other		
	($'000)						
Advanced Education	-	1,245	-	-	-	-	1,245
Agricultural Research Trust ..	-	-	-	-	-	-	394
Agriculture	-	-	-	-	-	-	19,900
Alcoholism & Drug Abuse Commission	-	-	-	-	-	-	319
Attorney General	-	-	-	-	200	-	200
Consumer & Corporate Affairs .	-	-	-	-	148	-	148
Culture	2,741	-	-	-	-	-	3,020
Economic Development	-	-	-	-	-	1,690	4,100
Education	-	3,617	-	-	-	-	3,617 (e)
Educational Communications Corporation ACCESS	-	220	-	-	-	-	220 (e)
Energy & Natural Resources ...	-	-	-	-	-	-	35,880
Environment	-	-	-	99	-	-	9,730
Environmental Centre	722	-	-	-	-	-	11,300
Environment Council	-	-	-	-	-	-	433
Executive Council	-	-	-	-	-	-	19,950
Hospitals & Medical Care	-	-	-	-	-	-	22,741
Housing & Public Works	-	-	-	380	-	-	965

Government of Alberta

TABLE 14. Application of Expenditures by Department or Agency, 1983-84 - Concluded

Department or Agency	Social development and related areas					Transportation	Total
	Culture, sport and recreation	Education	Human resources	Urban and regional studies	Other		
	($'000)						
Labour	-	-	723	-	-	-	723
Manpower	-	-	1,804	-	-	-	1,804
Mental Health Research Fund	-	-	-	-	-	-	388
Municipal Affairs	-	-	-	400	-	-	400
AOSTRA	-	-	-	-	-	-	71,478
Recreation & Parks	757	-	-	-	-	-	757
Solicitor General	-	-	-	-	285	-	4,600
Tourism & Small Business	-	20	30	125	-	-	1,540
Transportation	-	-	-	-	-	3,308	3,308
Treasury	-	-	-	-	2,138	-	2,138
Workers' Health, Safety & Compensation	-	-	-	-	-	-	911
Total	4,220	5,102	2,557	1,004	2,771	4,998	222,207

Government of Alberta

TABLE 15. Total Expenditures by Application and Activity, 1982-83

Application	Intramural		Extramural		Total
	Research and development	Related scientific activities	Research and development	Related scientific activities	
	($'000)				
Advancement of science	612	-	9,446	-	10,058
Communications	-	652	-	2,556	3,208
Energy and fuels:					
Fossil fuels	7,528	189	38,124	455	46,296
Other	3,159	-	503	-	3,662
Environmental issues	2,905	4,457	4,801	378	12,451
Health	891	5,815	17,476	678	24,860
Industrial and economic development:					
Agriculture	5,382	4,588	9,652	-	19,622
Fisheries	429	1,702	50	14	2,195
Forestry	1,075	2,901	605	374	4,955
Manufacturing	-	980	-	550	1,530
Minerals	-	5	-	30	35
Other	390	4,243	13,354	3,547	21,261
Social development and related areas:					
Culture, sport and recreation	550	3,328	-	313	4,192
Education	97	1,247	205	3,454	5,003
Human resources	-	1,618	-	195	1,813
Urban and regional studies	321	240	39	275	875
Other	-	2,407	290	-	2,697
Transportation	-	1,813	13	3,114	4,940
Total	23,340	36,185	94,285	16,630	170,440

Government of Alberta

TABLE 16. Total Expenditures, by Application and Activity, 1983-84

Application	Intramural		Extramural		Total
	Research and development	Related scientific activities	Research and development	Related scientific activities	
	($'000)				
Advancement of science	622	-	9,367	-	9,989
Communications	-	802	-	3,513	4,315
Energy and fuels:					
Fossil fuels	14,353	190	72,032	275	86,850
Nuclear energy	-	-	147	-	147
Other	3,550	-	2,099	-	5,649
Environmental issues	3,179	4,369	4,926	316	12,790
Health	960	7,195	20,111	301	28,567
Industrial and economic development:					
Agriculture	6,042	5,637	11,694	50	23,423
Fisheries	373	1,336	45	6	1,760
Forestry	1,084	2,575	570	380	4,609
Manufacturing	-	1,000	-	550	1,550
Minerals	-	-	-	805	805
Other	317	3,983	13,607	3,479	21,386
Social development and related areas:					
Culture, sport and recreation	591	3,349	-	280	4,220
Education	98	1,297	205	3,502	5,102
Human resources	-	2,229	-	328	2,557
Urban and regional studies	400	230	39	335	1,004
Other	-	2,286	200	-	2,486
Transportation	-	1,838	10	3,150	4,998
Total	31,569	38,316	135,052	17,270	222,207

Government of Alberta

TABLE 17. Extramural R&D Expenditures, by Sector of Performance and Application, 1982-83

Application	Industry	Universities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)					
Advancement of science	107	3,889	-	4,772	678	9,446
Communications	-	-	-	-	-	-
Energy and fuels:						
Fossil fuels	30,580	994	-	6,550	-	38,124
Other	-	503	-	-	-	503
Environmental issues	577	530	-	3,664	30	4,801
Health	-	6,285	11,191	-	-	17,476
Industrial and economic development:						
Agriculture	426	3,525	-	3,664	2,037	9,652
Fisheries	50	-	-	-	-	50
Forestry	242	354	-	-	9	605
Manufacturing	-	-	-	-	-	-
Minerals	-	-	-	-	-	-
Other	525	-	-	12,526	30	13,081
Social development and related areas:						
Culture, sport and recreation	-	-	-	-	-	-
Education	50	50	-	5	100	205
Human resources	-	-	-	-	-	-
Urban and regional studies	39	-	-	-	-	39
Other	-	290	-	-	-	290
Transportation	10	-	-	3	-	13
Total	32,606	16,420	11,191	31,184	2,884	94,285

Government of Alberta

TABLE 18. Extramural R&D Expenditures, by Sector of Performance and Application, 1983-84

Application	Industry	Universities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)					
Advancement of science	117	4,375	-	4,875	-	9,367
Communications	-	-	-	-	-	-
Energy and fuels:						
Fossil fuels	61,172	854	-	5,506	4,500	72,032
Nuclear energy	147	-	-	-	-	147
Other	-	-	-	2,099	-	2,099
Environmental issues	595	530	-	3,801	-	4,926
Health	-	4,326	15,785	-	-	20,111
Industrial and economic development:						
Agriculture	800	4,394	-	4,000	2,500	11,694
Fisheries	45	-	-	-	-	45
Forestry	230	330	-	-	10	570
Manufacturing	-	-	-	-	-	-
Minerals	-	-	-	-	-	-
Other	610	-	-	12,967	30	13,607
Social development and related areas:						
Culture, sport and recreation	-	-	-	-	-	-
Education	50	50	-	5	100	205
Human resources	-	-	-	-	-	-
Urban and regional studies	39	-	-	-	-	39
Other	-	200	-	-	-	200
Transportation	10	-	-	-	-	10
Total	63,815	15,059	15,785	33,253	7,140	135,052

Government of Alberta

TABLE 19. Departmental Personnel Engaged in Intramural Activities, 1982-83

Department or Agency	Research and development				Related scientific activities			
	Scientific and professional	Technical	Other	Total	Scientific and professional	Technical	Other	Total
	(person-years)							
Advanced Education & Manpower	...	...	...	...	31	-	11	42
Agricultural Research Trust	-	-	-	-	...	...	...	...
Agriculture	50	68	-	118	...	...	...	...
Alcoholism & Drug Abuse Commission	...	...	...	...	5	-	1	6
Attorney General	...	...	...	...	...	...	...	...
Consumer & Corporate Affairs	...	...	...	...	4	-	1	5
Culture	4	2	-	6	31	24	10	65
Economic Development	...	...	...	...	70	-	15	85
Education	2	-	2	4	12	1	6	19 (e)
Educational Communications Corporation ACCESS	...	...	...	...	4	-	1	5 (e)
Energy & Natural Resources	24	17	6	47	70	63	9	142
Environment	16	11	14	41	19	29	29	77
Environmental Centre	27	34	19	80	47	62	29	138
Environment Council	13	-	-	13	-	2	2	4
Executive Council	...	...	...	...	...	...	...	...
Hospitals & Medical Care	-	-	-	-	18	5	11	34
Housing & Public Works	...	...	...	...	8	1	1	10

Government of Alberta

TABLE 19. Departmental Personnel Engaged in Intramural Activities, 1982-83 - Concluded

Department or Agency	Research and development				Related scientific activities			
	Scientific and professional	Technical	Other	Total	Scientific and professional	Technical	Other	Total
	(person-years)							
Labour	...	...	...	...	11	2	8	21
Mental Health Research Fund	...	...	...	...	...	...	...	...
Municipal Affairs	5	-	1	6	-	-	-	-
AOSTRA	33	-	11	44	...	...	...	...
Recreation & Parks	...	...	...	...	15	10	-	25
Social Services & Community Health	...	...	...	...	-	-	-	-
Solicitor General	...	...	...	...	13	20	5	38
Tourism & Small Business	...	...	...	...	20	3	5	28
Transportation	...	...	...	...	14	5	5	24
Treasury	...	...	...	...	28	4	25	57
Workers' Health, Safety & Compensation	...	...	...	...	8	5	3	16
Total	174	132	53	359	428	236	177	841

Government of Alberta

TABLE 20. Departmental Personnel Engaged in Intramural Activities, 1983-84

Department or Agency	Research and development				Related scientific activities			
	Scientific and professional	Technical	Other	Total	Scientific and professional	Technical	Other	Total
	(person-years)							
Advanced Education	...	...	...	...	18	-	2	20
Agricultural Research Trust	-	-	-	-	...	...	...	...
Agriculture	50	68	-	118	...	...	...	...
Alcoholism & Drug Abuse Commission	...	...	...	...	5	2	2	9
Attorney General	...	...	...	...	...	...	...	...
Consumer & Corporate Affairs	...	...	...	...	4	-	1	5
Culture	4	2	-	6	31	24	10	64
Economic Development	...	...	...	...	70	-	15	85
Education	2	-	2	4	12	1	6	20
Educational Communications Corporation ACCESS	...	...	...	...	4	-	1	5 (e)
Energy & Natural Resources	22	16	6	44	64	39	8	111
Environment	17	11	14	42	18	29	29	76
Environmental Centre	27	34	19	80	47	62	28	138
Environment Council	13	-	-	13	-	2	2	4
Executive Council	...	...	...	...	...	...	...	...
Hospitals & Medical Care	-	-	-	-	18	7	11	36
Housing & Public Works	...	...	...	...	9	1	1	11

Government of Alberta

TABLE 20. Departmental Personnel Engaged in Intramural Activities, 1983-84 - Concluded

Department or Agency	Research and development				Related scientific activities			
	Scientific and professional	Technical	Other	Total	Scientific and professional	Technical	Other	Total
	(person-years)							
Labour	...	...	...	...	10	2	7	19
Mental Health Research Fund	...	...	...	...	...	...	...	...
Municipal Affairs	6	-	2	8	-	-	-	-
AOSTRA	36	-	12	48	...	...	...	...
Recreation & Parks	...	...	...	...	14	5	9	19
Social Services & Community Health	...	...	...	...	-	-	-	-
Solicitor General	...	...	...	...	13	20	5	38
Tourism & Small Business	...	...	...	...	21	3	6	30
Transportation	...	...	...	...	13	5	5	23
Treasury	...	...	...	...	28	4	25	57
Workers' Health, Safety & Compensation	1	-	-	1	8	5	3	16
Total	178	131	55	364	436	211	110	827

Natural Sciences

Government of Alberta

TABLE 21. Total Expenditures in the Natural Sciences, by Activity, 1976-77 to 1983-84

Activity	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Research and development:								
Current expenditures:								
In-house	4,174	3,355	2,098	4,842	6,737	11,156	14,514	15,978
Contracts	11,861	19,669	36,877	47,294	38,797	46,592	51,563	88,298
Grants	12,145	17,488	18,444	25,815	29,814	32,533	41,002	44,914
Research fellowships	50	152	110	202	85	267	283	303
Sub-total	28,230	40,664	57,529	78,153	75,433	90,548	107,362	149,493
Capital expenditures	137	590	2,381	1,380	1,408	1,929	8,020	14,657
Related scientific activities:								
Current expenditures	9,807	8,568	7,588	12,824	16,864	29,736	26,096	26,380
Capital expenditures	98	124	72	439	628	1,712	1,822	1,671
Total	38,072	49,946	67,570	92,796	94,333	123,925	143,300	192,201

Government of Alberta

TABLE 22. Total Expenditures in the Natural Sciences, by Department or Agency, 1976-77 to 1983-84

Department or Agency	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Agricultural Research Trust ..	...	...	441	472	389	395	373	394
Agriculture	3,754(e)	3,750	3,500	4,656	7,130	14,978	16,391	19,900
Business Development & Tourism	7,130	7,520	...	...	...	...	...	...
Culture	1,111	1,111(e)	969	777	510	988	578	558
Energy & Natural Resources ...	6,176	5,163	9,140	12,819	14,274	20,630	25,210	35,880
Environment	7,725	8,364	5,636	10,321	11,649	11,711	9,179	9,325
Environmental Centre	...	...	...	-	3,168	7,441	10,528	11,300
Environment Council	...	...	202	-	-	-	-	-
Executive Council	...	...	8,209	9,153	11,561	15,500	19,148	19,950
Hospitals & Medical Care	...	1,848	4,517	11,896	12,138	12,942	16,865	19,462
Mental Health Research Fund ..	...	...	60	72	123	177	193	193
AOSTRA	10,132	18,737	32,746	40,195	30,988	35,335	41,105	71,478
Recreation & Parks	...	...	--	398	295	604	429	407
Recreation, Parks & Wildlife	889	889(e)	...	...	...	...	...	...
Transportation	1,155	2,564	1,888	1,811	1,932	3,050	3,262	3,308
Workers' Health, Safety & Compensation	...	...	262	276	178	176	39	46
Total	38,072	49,946	67,570	92,796	94,333	123,925	143,300	192,201

Government of Alberta

TABLE 23. Total Expenditures in the Natural Sciences, by Performer, 1976-77 to 1983-84

Performer	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Intramural	11,222	9,240	9,844	15,317	15,861	35,062	44,501	52,611
Industry	12,385	22,995	35,607	43,979	36,743	35,871	35,452	66,470
Universities	1,888	1,817	3,700	5,090	6,473	8,502	16,032	14,849
Hospitals and health organizations	(1)	1,848	4,531	11,862	12,138	12,630	11,080	15,674
Alberta Research Council (2) .	10,474	10,741	12,874	14,009	20,587	27,745	32,349	34,565
Other	2,103	3,305	1,014	2,539	2,531	4,115	3,886	8,232
Total	38,072	49,946	67,570	92,796	94,333	123,925	143,300	192,201

(1) Before 1977-78, Hospitals and health organizations were included in Other performers.
(2) Annual funding by the Government of Alberta - other funds are not included.

Government of Alberta

TABLE 24. Current Expenditures on R&D in the Natural Sciences, by Performer, 1976-77 to 1983-84

Performer	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Intramural	4,758	3,372	3,026	5,096	6,794	11,208	14,514	15,984
Industry	11,681	20,734	33,776	41,309	28,263	28,461	32,058	63,113
Universities	1,518	1,650	3,360	4,840	6,286	8,333	15,777	14,464
Hospitals and health organizations	(1)	1,848	4,531	11,862	12,138	12,630	11,080	15,674
Alberta Research Council (2)	8,704	10,188	12,175	12,837	19,565	26,679	31,179	33,248
Other	1,571	2,872	661	2,209	2,387	3,237	2,754	7,010
Total	28,230	40,664	57,529	78,153	75,433	90,548	107,362	149,493

(1) Before 1977-78, Hospitals and health organizations were included in Other performers.
(2) Annual funding by the Government of Alberta - other funds are not included.

Government of Alberta

TABLE 25. Current Expenditures on R&D in the Natural Sciences, by Department or Agency, 1976-77 to 1983-84

Department or Agency	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Agricultural Research Trust ..	...	...	441	472	389	395	373	394
Agriculture	2,351(e)	3,750	3,500	4,656	7,130	10,978	13,699	16,300
Business Development & Tourism	7,130	7,520	...	...	...	...	...	...
Culture	261	261	188	173	-	-	-	-
Energy & Natural Resources ...	4,476	3,669	4,739	6,193	7,390	9,608	9,521	14,883
Environment	3,233	3,864	2,586	4,328	3,480	3,214	3,481	3,537
Environmental Centre	...	...	...	-	1,300	2,157	2,997	3,329
Environment Council	...	...	97	-	-	-	-	-
Executive Council	...	...	8,209	9,153	11,561	15,500	19,148	19,950
Hospitals & Medical Care	...	1,848	4,517	11,846	12,138	12,942	16,865	19,462
Mental Health Research Fund ..	...	...	60	72	123	177	193	193
AOSTRA	9,821	18,126	32,177	40,077	30,960	35,305	41,068	71,423
Recreation & Parks	...	...	--	-	-	-	-	-
Recreation, Parks & Wildlife	445	445(e)	...	...	...	...	...	...
Transportation	513	1,181	998	1,131	952	272	13	10
Workers' Health, Safety & Compensation	...	...	17	52	10	-	6	12
Total	28,230	40,864	57,529	78,153	75,433	90,548	107,362	149,493

Government of Alberta

TABLE 26. Total Expenditures in the Natural Sciences, by Sources of Funds, 1982-83

Department or Agency	Departmental budget	Transfers from other departments	Transfers from federal government	Trust funds	Other sources	Total
	($'000)					
Agricultural Research Trust ..	-	250	-	-	123	373
Agriculture	10,456	-	-	5,935	-	16,391
Culture	558	-	20	-	-	578
Energy & Natural Resources ...	12,195	-	-	-	13,015	25,210
Environment	8,905	-	-	274	-	9,179
Environmental Centre	10,528	-	-	-	-	10,528
Executive Council	19,148	-	-	-	-	19,148
Hospitals & Medical Care	13,931	-	-	2,934	-	16,865
Mental Health Research Fund ..	-	193	-	-	-	193
AOSTRA	3,100	-	-	38,005	-	41,105
Recreation & Parks	429	-	-	-	-	429
Transportation	3,262	-	-	-	-	3,262
Workers' Health, Safety & Compensation	39	-	-	-	-	39
Total	82,551	443	20	47,148	13,138	143,300

Government of Alberta

TABLE 27. Total Expenditures in the Natural Sciences, by Activity and Performer, 1982-83

Activity	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Research and development:							
Current expenditures:							
In-house	14,514	...	...	...	...	...	14,514
Contracts	-	31,958	5,105	-	12,031	2,469	51,563
Grants	-	100	10,389	11,080	19,148	285	41,002
Research fellowships	-	-	283	-	-	-	283
Sub-total	14,514	32,058	15,777	11,080	31,179	2,754	107,362
Capital expenditures	8,020	...	...	...	...	...	8,020
Related scientific activities:							
Current expenditures	20,145	3,394	255	-	1,170	1,132	26,096
Capital expenditures	1,822	...	...	...	...	...	1,822
Total	44,501	35,452	16,032	11,080	32,349	3,886	143,300

Government of Alberta

TABLE 28. Total Expenditures in the Natural Sciences, by Activity and Performer, 1983-84

Activity	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Research and development:							
Current expenditures:							
In-house	15,978	...	...	...	...	...	15,978
Contracts	6	63,013	4,971	-	13,298	7,010	88,298
Grants	-	100	9,190	15,674	19,950	-	44,914
Research fellowships	-	-	303	-	-	-	303
Sub-total	15,984	63,113	14,464	15,674	33,248	7,010	149,493
Capital expenditures	14,657	...	...	...	...	...	14,657
Related scientific activities:							
Current expenditures	20,299	3,357	185	-	1,317	1,222	26,380
Capital expenditures	1,671	...	...	...	...	...	1,671
Total	52,611	66,470	14,649	15,674	34,565	8,232	192,201

Government of Alberta

TABLE 29. Total Expenditures in the Natural Sciences, by Department or Agency and Performer, 1982-83

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Agricultural Research Trust ..	23	-	350	-	-	-	373
Agriculture	7,100	418	3,172	-	3,664	2,037	16,391
Culture	578	-	-	-	-	-	578
Energy & Natural Resources ...	16,584	3,419	1,299	-	3,889	19	25,210
Environment	5,309	2,661	707	-	489	13	9,179
Environmental Centre	10,498	-	-	-	-	30	10,528
Executive Council	-	-	-	-	19,148	-	19,148
Hospitals & Medical Care	-	-	5,785	11,080	-	-	16,865
Mental Health Research Fund ..	-	-	193	-	-	-	193
AOSTRA	3,100	28,029	4,526	-	4,772	678	41,105
Recreation & Parks	222	207	-	-	-	-	429
Transportation	1,048	718	-	-	387	1,109	3,262
Workers' Health, Safety & Compensation	39	-	-	-	-	-	39
Total	44,501	35,452	16,032	11,080	32,349	3,886	143,300

Government of Alberta

TABLE 30. Total Expenditures in the Natural Sciences, by Department or Agency and Performer, 1983-84

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Agricultural Research Trust ..	24	-	370	-	-	-	394
Agriculture	8,600	800	4,000	-	4,000	2,500	19,900
Culture	558	-	-	-	-	-	558
Energy & Natural Resources ...	21,998	7,819	1,234	-	4,819	10	35,880
Environment	5,307	2,875	734	-	409	-	9,325
Environmental Centre	11,300	-	-	-	-	-	11,300
Executive Council	-	-	-	-	19,950	-	19,950
Hospitals & Medical Care	-	-	3,788	15,674	-	-	19,462
Mental Health Research Fund ..	-	-	193	-	-	-	193
AOSTRA	3,478	54,295	4,330	-	4,875	4,500	71,478
Recreation & Parks	232	175	-	-	-	-	407
Transportation	1,068	506	-	-	512	1,222	3,308
Workers' Health, Safety & Compensation	46	-	-	-	-	-	46
Total	52,611	66,470	14,649	15,674	34,565	8,232	192,201

Government of Alberta

TABLE 31. Current Expenditures on R&D in the Natural Sciences, by Department or Agency and Performer, 1982-83

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Agricultural Research Trust ..	23	-	350	-	-	-	373
Agriculture	4,408	418	3,172	-	3,684	2,037	13,699
Energy & Natural Resources ...	2,223	3,013	1,173	-	3,103	9	9,521
Environment	1,826	588	578	-	489	-	3,481
Environmental Centre	2,967	-	-	-	-	30	2,997
Executive Council	-	-	-	-	19,148	-	19,148
Hospitals & Medical Care	-	-	5,785	11,080	-	-	16,865
Mental Health Research Fund ..	-	-	193	-	-	-	193
AOSTRA	3,061	28,029	4,526	-	4,772	678	41,066
Transportation	-	10	-	-	3	-	13
Workers' Health, Safety & Compensation	6	-	-	-	-	-	6
Total	14,514	32,058	15,777	11,080	31,179	2,754	107,362

Government of Alberta

TABLE 32. Current Expenditures on R&D in the Natural Sciences, by Department or Agency and Performer, 1983-84

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Agricultural Research Trust ..	24	-	370	-	-	-	394
Agriculture	5,000	800	4,000	-	4,000	2,500	16,300
Energy & Natural Resources ...	2,221	7,454	1,184	-	4,014	10	14,883
Environment	1,975	554	599	-	409	-	3,537
Environmental Centre	3,329	-	-	-	-	-	3,329
Executive Council	-	-	-	-	19,950	-	19,950
Hospitals & Medical Care	-	-	3,788	15,674	-	-	19,462
Mental Health Research Fund ..	-	-	193	-	-	-	193
AOSTRA	3,423	54,295	4,330	-	4,875	4,500	71,423
Transportation	-	10	-	-	-	-	10
Workers' Health, Safety & Compensation	12	-	-	-	-	-	12
Total	15,984	63,113	14,464	15,674	33,248	7,010	149,493

Government of Alberta

TABLE 33. Application of Expenditures in the Natural Sciences, by Department or Agency, 1982-83

Department or Agency	Advancement of science	Communi-cations	Energy and fuels				Environmental issues
			Fossil fuels	Hydro electric energy	Nuclear energy	Other	
	($'000)						
Agricultural Research Trust .	-	-	-	-	-	-	-
Agriculture	-	-	-	-	-	-	-
Culture	-	-	-	-	-	-	-
Energy & Natural Resources ..	-	-	13,824	-	-	562	-
Environment	505	-	189	-	-	-	5,689
Environmental Centre	-	-	129	-	-	-	3,020
Executive Council	-	-	3,447	-	-	-	3,255
Hospitals & Medical Care	-	-	-	-	-	-	-
Mental Health Research Fund .	-	-	-	-	-	-	-
AOSTRA	9,298	-	28,707	-	-	3,100	-
Recreation & Parks	-	-	-	-	-	-	-
Transportation	-	-	-	-	-	-	-
Workers' Health, Safety & Compensation	-	-	-	-	-	-	-
Total	9,803	-	46,296	-	-	3,662	11,964

Government of Alberta

TABLE 33. Application of Expenditures in the Natural Sciences, by Department or Agency, 1982-83 - Continued

Department or Agency	Health	Industrial and economic development					
		Agriculture	Fisheries	Forestry	Manufac-turing	Minerals	Other
	($'000)						
Agricultural Research Trust .	-	373	-	-	-	-	-
Agriculture	-	16,391	-	-	-	-	-
Culture	-	-	-	-	-	-	-
Energy & Natural Resources ..	-	75	2,066	4,352	-	697	3,634
Environment	95	102	-	-	-	-	2,560
Environmental Centre	3,766	2,681	129	129	-	-	-
Executive Council	-	-	-	-	-	-	12,446
Hospitals & Medical Care	16,865	-	-	-	-	-	-
Mental Health Research Fund .	193	-	-	-	-	-	-
AOSTRA	-	-	-	-	-	-	-
Recreation & Parks	-	-	-	-	-	-	-
Transportation	-	-	-	-	-	-	-
Workers' Health, Safety & Compensation	39	-	-	-	-	-	-
Total	20,958	19,622	2,195	4,481	-	697	18,640

Government of Alberta

TABLE 33. Application of Expenditures in the Natural Sciences, by Department or Agency, 1982-83 - Concluded

Department or Agency	Social development and related areas					Total
	Culture, sport and recreation	Education	Human resources	Urban and regional studies	Transportation	
	($'000)					
Agricultural Research Trust	-	-	-	-	-	373
Agriculture	-	-	-	-	-	16,391
Culture	578	-	-	-	-	578
Energy & Natural Resources	-	-	-	-	-	25,210
Environment	-	-	-	39	-	9,179
Environmental Centre	874	-	-	-	-	10,528
Executive Council	-	-	-	-	-	19,148
Hospitals & Medical Care	-	-	-	-	-	16,865
Mental Health Research Fund	-	-	-	-	-	193
AOSTRA	-	-	-	-	-	41,105
Recreation & Parks	429	-	-	-	-	429
Transportation	-	-	-	-	3,262	3,262
Workers' Health, Safety & Compensation	-	-	-	-	-	39
Total	1,681	-	-	39	3,262	143,300

Government of Alberta

TABLE 34. Application of Expenditures in the Natural Sciences, by Department or Agency, 1983-84

Department or Agency	Advancement of science	Communi-cations	Energy and fuels				Environmental issues
			Fossil fuels	Hydro electric energy	Nuclear energy	Other	
	($'000)						
Agricultural Research Trust	-	-	-	-	-	-	-
Agriculture	-	-	-	-	-	-	-
Culture	-	-	-	-	-	-	-
Energy & Natural Resources	-	-	24,136	-	147	2,171	-
Environment	505	-	190	-	-	-	5,724
Environmental Centre	-	-	138	-	-	-	3,241
Executive Council	-	-	3,591	-	-	-	3,392
Hospitals & Medical Care	-	-	-	-	-	-	-
Mental Health Research Fund	-	-	-	-	-	-	-
AOSTRA	9,205	-	58,795	-	-	3,478	-
Recreation & Parks	-	-	-	-	-	-	-
Transportation	-	-	-	-	-	-	-
Workers' Health, Safety & Compensation	-	-	-	-	-	-	-
Total	9,710	-	86,850	-	147	5,649	12,357

Government of Alberta

TABLE 34. Application of Expenditures in the Natural Sciences, by Department or Agency, 1983-84 - Continued

Department or Agency	Health	Industrial and economic development					
		Agriculture	Fisheries	Forestry	Manufac-turing	Minerals	Other
	($'000)						
Agricultural Research Trust .	-	394	-	-	-	-	-
Agriculture	-	19,900	-	-	-	-	-
Culture	-	-	-	-	-	-	-
Energy & Natural Resources ..	-	127	1,622	3,991	-	805	2,881
Environment	45	124	-	-	-	-	2,698
Environmental Centre	4,045	2,878	138	138	-	-	-
Executive Council	-	-	-	-	-	-	12,967
Hospitals & Medical Care	19,462	-	-	-	-	-	-
Mental Health Research Fund .	193	-	-	-	-	-	-
AOSTRA	-	-	-	-	-	-	-
Recreation & Parks	-	-	-	-	-	-	-
Transportation	-	-	-	-	-	-	-
Workers' Health, Safety & Compensation	46	-	-	-	-	-	-
Total	23,791	23,423	1,760	4,129	-	805	18,546

Government of Alberta

TABLE 34. Application of Expenditures in the Natural Sciences, by Department or Agency, 1983-84 - Concluded

Department or Agency	Social development and related areas					Total
	Culture, sport and recreation	Education	Human resources	Urban and regional studies	Transportation	
	($'000)					
Agricultural Research Trust	-	-	-	-	-	394
Agriculture	-	-	-	-	-	19,900
Culture	558	-	-	-	-	558
Energy & Natural Resources	-	-	-	-	-	35,880
Environment	-	-	-	39	-	9,325
Environmental Centre	722	-	-	-	-	11,300
Executive Council	-	-	-	-	-	19,950
Hospitals & Medical Care	-	-	-	-	-	19,462
Mental Health Research Fund	-	-	-	-	-	193
AOSTRA	-	-	-	-	-	71,478
Recreation & Parks	407	-	-	-	-	407
Transportation	-	-	-	-	3,308	3,308
Workers' Health, Safety & Compensation	-	-	-	-	-	46
Total	1,687	-	-	39	3,308	192,201

Government of Alberta

TABLE 35. Application of Expenditures in the Natural Sciences, by Application and Activity, 1982-83

Application	Intramural		Extramural		Total
	Research and development	Related scientific activities	Research and development	Related scientific activities	
	($'000)				
Advancement of science	505	-	9,298	-	9,803
Energy and fuels:					
Fossil fuels	7,528	189	38,124	455	46,296
Other	3,159	-	503	-	3,662
Environmental issues	2,665	4,321	4,765	213	11,964
Health	891	2,914	17,103	50	20,958
Industrial and economic development:					
Agriculture	5,382	4,588	9,652	-	19,622
Fisheries	429	1,702	50	14	2,195
Forestry	1,075	2,801	605	-	4,481
Minerals	-	-	-	697	697
Other	390	3,440	12,696	2,114	18,640
Social development and related areas:					
Culture, sport and recreation	510	964	-	207	1,681
Urban and regional studies	-	-	39	-	39
Transportation	-	1,048	13	2,201	3,262
Total	22,534	21,967	92,848	5,951	143,300

Government of Alberta

TABLE 36. Application of Expenditures in the Natural Sciences, by Application and Activity, 1983-84

Application	Intramural		Extramural		Total
	Research and development	Related scientific activities	Research and development	Related scientific activities	
	($'000)				
Advancement of science	505	-	9,205	-	9,710
Energy and fuels:					
Fossil fuels	14,353	190	72,032	275	86,850
Nuclear energy	-	-	147	-	147
Other	3,550	-	2,099	-	5,649
Environmental issues	2,911	4,284	4,846	316	12,357
Health	960	3,131	19,700	-	23,791
Industrial and economic development:					
Agriculture	6,042	5,637	11,694	50	23,423
Fisheries	373	1,336	45	6	1,760
Forestry	1,084	2,475	570	-	4,129
Minerals	-	-	-	805	805
Other	317	2,883	13,122	2,224	18,546
Social development and related areas:					
Culture, sport and recreation	546	966	-	175	1,687
Urban and regional studies	-	-	39	-	39
Transportation	-	1,068	10	2,230	3,308
Total	30,641	21,970	133,509	6,081	192,201

Government of Alberta

TABLE 37. Extramural R&D Expenditures in the Natural Sciences, by Sector of Performance and Application, 1982-83

Application	Industry	Universities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)					
Advancement of science	-	3,848	-	4,772	678	9,298
Energy and fuels:						
Fossil fuels	30,580	994	-	6,550	-	38,124
Other	-	503	-	-	-	503
Environmental issues	541	530	-	3,664	30	4,765
Health	-	6,023	11,080	-	-	17,103
Industrial and economic development:						
Agriculture	428	3,525	-	3,664	2,037	9,652
Fisheries	50	-	-	-	-	50
Forestry	242	354	-	-	9	605
Other	170	-	-	12,526	-	12,696
Social development and related areas:						
Urban and regional studies	39	-	-	-	-	39
Transportation	10	-	-	3	-	13
Total	32,058	15,777	11,080	31,179	2,754	92,848

Government of Alberta

TABLE 38. Extramural R&D Expenditures in the Natural Sciences, by Sector of Performance and Application, 1983-84

Application	Industry	Universities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)					
Advancement of science	-	4,330	-	4,875	-	9,205
Energy and fuels:						
Fossil fuels	61,172	854	-	5,506	4,500	72,032
Nuclear energy	147	-	-	-	-	147
Other	-	-	-	2,099	-	2,099
Environmental issues	515	530	-	3,801	-	4,846
Health	-	4,026	15,674	-	-	19,700
Industrial and economic development:						
Agriculture	800	4,394	-	4,000	2,500	11,694
Fisheries	45	-	-	-	-	45
Forestry	230	330	-	-	10	570
Other	155	-	-	12,967	-	13,122
Social development and related areas:						
Urban and regional studies	39	-	-	-	-	39
Transportation	10	-	-	-	-	10
Total	63,113	14,464	15,674	33,248	7,010	133,509

Government of Alberta

TABLE 39. Departmental Personnel Engaged in Intramural Natural Science Activities, 1982-83

Department or Agency	Research and development				Related scientific activities			
	Scientific and professional	Technical	Other	Total	Scientific and professional	Technical	Other	Total
	(person-years)							
Agricultural Research Trust ...	-	-	-	-	...	...	...	...
Agriculture	50	68	-	118	...	...	...	...
Culture	-	-	-	-	9	8	2	19
Energy & Natural Resources	24	17	6	47	70	63	9	142
Environment	16	11	14	41	19	29	29	77
Environmental Centre	27	34	19	80	47	62	29	138
Executive Council	...	...	...	...	...	...	...	...
Hospitals & Medical Care	...	...	...	...	...	...	...	...
Mental Health Research Fund ...	...	...	...	...	...	...	...	...
AOSTRA	33	-	11	44	...	...	...	...
Recreation & Parks	...	...	...	...	7	2	-	9
Transportation	...	...	...	...	14	5	5	24
Workers' Health, Safety & Compensation	...	...	...	...	1	1	-	2
Total	150	130	50	330	167	170	74	411

Government of Alberta

TABLE 40. Departmental Personnel Engaged in Intramural Natural Science Activities, 1983-84

Department or Agency	Research and development				Related scientific activities			
	Scientific and professional	Technical	Other	Total	Scientific and professional	Technical	Other	Total
	(person-years)							
Agricultural Research Trust	-	-	-	-	...	...	...	...
Agriculture	50	68	-	118	...	...	...	...
Culture	-	-	-	-	9	8	1	18
Energy & Natural Resources	22	16	6	44	64	39	8	111
Environment	17	11	14	42	18	29	29	76
Environmental Centre	27	34	19	80	47	62	29	138
Executive Council	...	...	...	...	...	...	...	...
Hospitals & Medical Care	...	...	...	...	...	...	...	...
Mental Health Research Fund	...	...	...	...	...	...	...	...
AOSTRA	36	-	12	48	...	...	...	...
Recreation & Parks	...	...	...	...	7	2	-	9
Transportation	...	...	...	...	13	5	5	23
Workers' Health, Safety & Compensation	1	-	-	1	1	1	-	2
Total	153	129	51	333	159	146	72	377

Social Sciences and Humanities

Government of Alberta

TABLE 41. Total Expenditures in the Social Sciences and Humanities, by Activity, 1976-77 to 1983-84

Activity	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Research and development:								
Current expenditures:								
In-house	643	616	647	996	1,011	1,092	743	818
Contracts	1,059	821	1,141	1,428	937	604	429	527
Grants	877	631	1,290	1,479	890	1,023	1,038	1,093
Research fellowships	-	-	2	-	27	4	23	23
Sub-total	2,579	2,068	3,080	3,903	2,865	2,728	2,233	2,461
Capital expenditures	11	2	3	4	13	3	10	10
Related scientific activities:								
Current expenditures	9,661	11,993	10,853	12,664	16,413	23,407	24,719	27,348
Capital expenditures	9	6	188	171	92	39	178	187
Total	12,260	14,069	14,124	16,742	19,383	26,177	27,140	30,006

Government of Alberta

TABLE 42. Total Expenditures in the Social Sciences and Humanities, by Department or Agency, 1976-77 to 1983-84

Department or Agency	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Advanced Education	763	834	2,408	2,075	1,920	2,344	2,417	1,245
Agricultural Research Trust ..	...	...	20	-	-	-	-	-
Alcoholism & Drug Abuse Commission	...	232	248	282	375	497	264	319
Attorney General	357	299	238	260	290	290	290	200
Business Development & Tourism	896	3,246	...	...	...	...	...	...
Consumer & Corporate Affairs	90	90	62	75	89	120	143	148
Culture	2,051	2,051 (e)	1,142	1,642	1,729	2,332 (e)	2,255	2,462
Economic Development	...	...	2,117	3,125	3,484	5,857	4,093	4,100
Education	1,723	1,450	1,932	2,114	2,414	3,050	3,617 (e)	3,617 (e)
Educational Communications Corporation ACCESS	130	-	263	215	165	182 (e)	200 (e)	220 (e)
Energy & Natural Resources ...	...	22	-	-	-	-	-	-
Environment	57	270	250	590	253	557	508	405
Environment Conservation Authority	792	...	...	...	...	...	...	...
Environment Council	...	--	90	252	555	399	352	433
Health Care Insurance Commission	109	...	...	...	...	...	...	...
Hospital Services Commission	881	...	...	...	...	...	...	...
Hospitals & Medical Care	...	1,357	1,142	1,030	1,792	2,091	2,637	3,279
Housing & Public Works	685	975	390	420	324	480	805	985

Government of Alberta

TABLE 42. Total Expenditures in the Social Sciences and Humanities, by Department or Agency, 1976-77 to 1983-84 - Concluded

Department or Agency	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Labour	260	219	266	379	353	462	557	723
Manpower	...	...	...	...	...	...	...	1,804
Mental Health Research Fund	...	...	122	158	355	183	193	193
Municipal Affairs	331	125	399	258	364	372	321	400
Recreation & Parks	...	...	--	182	283	306	511	350
Recreation, Parks & Wildlife	282	282 (e)	...	...	...	...	...	...
Social Services & Community Health	705 (e)	725	535	630	733	933	100	...
Solicitor General	114	267	257	35	183	1,754	3,478	4,800
Tourism & Small Business	...	...	517	1,046	1,451	1,246	1,597	1,540
Treasury	2,026	1,625	1,161	1,426	1,868	2,085	1,994	2,138
Workers' Compensation Board	28	-	165	-	-	-	-	-
Workers' Health, Safety & Compensation	...	...	400	548	403	637	808	865
Total	12,260	14,069	14,124	16,742	19,385	26,177	27,140	30,006

Government of Alberta

TABLE 43. Total Expenditures in the Social Sciences and Humanities, by Performer, 1976-77 to 1983-84

Performer	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Intramural	7,924	8,595	8,542	10,550	12,437	16,453	15,024	17,274
Industry	1,337	3,151	2,172	3,032	4,257	7,103	9,152	9,873
Universities	386	321	1,708	1,901	1,603	1,637	1,841	1,655
Hospitals and health organizations	(1)	805	687	468	183	171	111	159
Alberta Research Council	-	-	-	-	2	5	5	5
Other	2,613	1,197	1,015	791	901	808	1,007	1,040
Total	12,260	14,069	14,124	16,742	19,383	26,177	27,140	30,006

(1) Before 1977-78, Hospitals and health organizations were included in Other performers.

Government of Alberta

TABLE 44. Current Expenditures on R&D in the Social Sciences and Humanities, by Performer, 1976-77 to 1983-84

Performer	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Intramural	851	855	957	1,270	1,091	1,092	796	918
Industry	605	494	620	832	1,660	485	548	702
Universities	253	281	893	1,161	757	756	643	595
Hospitals and health organizations	(1)	130	254	213	178	171	111	111
Alberta Research Council	-	-	-	-	2	5	5	5
Other	870	308	356	427	177	219	130	130
Total	2,579	2,068	3,080	3,903	2,865	2,728	2,233	2,461

(1) Before 1977-78, Hospitals and health organizations were included in Other performers.

Government of Alberta

TABLE 45. Current Expenditures on R&D in the Social Sciences and Humanities, by Department or Agency, 1976-77 to 1983-84

Department or Agency	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Advanced Education	56	-	320	550	-	-	-	-
Agricultural Research Trust ..	...	...	20	-	-	-	-	-
Alcoholism & Drug Abuse Commission	...	-	57	93	118	7	7	7
Attorney General	225	219	238	260	290	290	290	200
Business Development & Tourism	572	14	...	...	...	...	...	...
Consumer & Corporate Affairs .	54	45	-	-	-	-	-	-
Culture	-	-(e)	157	383	377	594(e)	296	324
Education	982	1,020	1,203	1,137	438	381	285(e)	285(e)
Educational Communications Corporation ACCESS	-	-	-	5	5	6(e)	7(e)	8(e)
Environment	2	-	250	483	41	45	-	-
Environment Council	...	--	-	186	435	314	276	348
Hospital Services Commission .	127	...	...	...	...	...	...	...
Hospitals & Medical Care	...	136	144	227	143	446	111	111
Housing & Public Works	34	-	-	-	37	100	385	485

TABLE 45. Current Expenditures on R&D in the Social Sciences and Humanities, by Department or Agency, 1976-77 to 1983-84 - Concluded

Government of Alberta

Department or Agency	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
	($'000)							
Mental Health Research Fund ..	...	...	122	144	355	183	193	193
Municipal Affairs	130	102	322	166	220	254	321	400
Recreation & Parks	...	...	--	-	-	-	-	-
Recreation, Parks & Wildlife	4	4 (e)	...	...	...	...	...	...
Social Services & Community Health	280 (e)	308	76	84	93	-	-	-
Solicitor General	101	-	-	35	24	-	-	-
Tourism & Small Business	...	...	-	-	79	-	-	-
Treasury	-	220	35	48	203	61	-	-
Workers' Compensation Board ..	12	-	36	-	-	-	-	-
Workers' Health, Safety & Compensation	...	...	100	122	7	47	62	100
Total	2,579	2,088	3,080	3,903	2,865	2,728	2,233	2,453

TABLE 46. Total Expenditures in the Social Sciences and Humanities, by Sources of Funds, 1982-83

Government of Alberta

Department or Agency	Departmental budget	Transfers from other departments	Transfers from federal government	Trust funds	Other sources	Total
	($'000)					
Advanced Education & Manpower	2,417	-	-	-	-	2,417
Alcoholism & Drug Abuse Commission	264	-	-	-	-	264
Attorney General	290	-	-	-	-	290
Consumer & Corporate Affairs	133	-	-	-	10	143
Culture	2,255	-	-	-	-	2,255
Economic Development	4,093	-	-	-	-	4,093
Education	3,360	-	257	-	-	3,617 (e)
Educational Communications Corporation ACCESS	200	-	-	-	-	200 (e)
Environment	265	-	-	243	-	508
Environment Council	352	-	-	-	-	352
Hospitals & Medical Care	2,637	-	-	-	-	2,637
Housing & Public Works	805	-	-	-	-	805
Labour	557	-	-	-	-	557
Mental Health Research Fund	-	193	-	-	-	193
Municipal Affairs	321	-	-	-	-	321
Recreation & Parks	511	-	-	-	-	511
Social Services & Community Health	100	-	-	-	-	100
Solicitor General	3,478	-	-	-	-	3,478
Tourism & Small Business	1,597	-	-	-	-	1,597
Treasury	1,994	-	-	-	-	1,994
Workers' Health, Safety & Compensation	115	-	-	235	458	808
Total	25,744	193	257	478	468	27,140

Government of Alberta

TABLE 47. Total Expenditures in the Social Sciences and Humanities, by Activity and Performer, 1982-83

Activity	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Research and development:							
Current expenditures:							
In-house	743	...	...	...	...	...	743
Contracts	53	278	98	-	-	-	429
Grants	-	270	522	111	5	130	1,038
Research fellowships	-	-	23	-	-	-	23
Sub-total	796	548	643	111	5	130	2,233
Capital expenditures	10	...	...	...	...	...	10
Related scientific activities:							
Current expenditures	14,040	8,604	1,198	-	-	877	24,719
Capital expenditures	178	...	...	...	...	...	178
Total	15,024	9,152	1,841	111	5	1,007	27,140

Government of Alberta

TABLE 48. Total Expenditures in the Social Sciences and Humanities, by Activity and Performer, 1983-84

Activity	Intra-mural	Industry	Universities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Research and development:							
Current expenditures:	818	...	...	...	...	...	818
In-house	100	332	95	-	-	-	527
Contracts	-	370	477	111	5	130	1,093
Grants	-	-	23	-	-	-	23
Research fellowships	918	702	595	111	5	130	2,461
Sub-total	10	...	...	...	...	...	10
Capital expenditures							
Related scientific activities:							
Current expenditures	16,159	9,171	1,060	48	-	910	27,348
Capital expenditures	187	...	...	...	...	...	187
Total	17,274	9,873	1,655	159	5	1,040	30,008

Government of Alberta

TABLE 49. Total Expenditures in the Social Sciences and Humanities, by Department or Agency and Performer, 1982-83

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Advanced Education & Manpower	1,302	122	891	-	-	102	2,417
Alcoholism & Drug Abuse Commission	194	63	7	-	-	-	264
Attorney General	-	-	290	-	-	-	290
Consumer & Corporate Affairs	143	-	-	-	-	-	143
Culture	2,107	107	41	-	-	-	2,255
Economic Development	2,000	2,093	-	-	-	-	4,093
Education	900	1,752	150	-	5	810	3,617 (e)
Educational Communications Corporation ACCESS	180	-	-	-	-	20	200 (e)
Environment	50	458	-	-	-	-	508
Environment Council	316	36	-	-	-	-	352
Hospitals & Medical Care	2,086	240	200	111	-	-	2,637
Housing & Public Works	280	495	-	-	-	30	805
Labour	555	2	-	-	-	-	557
Mental Health Research Fund	-	-	193	-	-	-	193
Municipal Affairs	321	-	-	-	-	-	321
Recreation & Parks	405	106	-	-	-	-	511
Social Services & Community Health	-	100	-	-	-	-	100
Solicitor General	922	2,556	-	-	-	-	3,478
Tourism & Small Business	648	904	-	-	-	45	1,597
Treasury	1,994	-	-	-	-	-	1,994
Workers' Health, Safety & Compensation	621	118	69	-	-	-	808
Total	15,024	9,152	1,841	111	5	1,007	27,140

Government of Alberta

TABLE 50. Total Expenditures in the Social Sciences and Humanities, by Department or Agency and Performer, 1983-84

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Advanced Education	277	33	935	-	-	-	1,245
Alcoholism & Drug Abuse Commission	249	63	7	-	-	-	319
Attorney General	-	-	200	-	-	-	200
Consumer & Corporate Affairs	148	-	-	-	-	-	148
Culture	2,300	117	45	-	-	-	2,462
Economic Development	2,000	2,100	-	-	-	-	4,100
Education	900	1,752	150	-	5	810	3,617 (e)
Educational Communications Corporation ACCESS	198	-	-	-	-	22	220 (e)
Environment	15	390	-	-	-	-	405
Environment Council	353	80	-	-	-	-	433
Hospitals & Medical Care	3,120	-	-	159	-	-	3,279
Housing & Public Works	280	655	-	-	-	30	965
Labour	595	-	-	-	-	128	723
Manpower	1,604	200	-	-	-	-	1,804
Mental Health Research Fund	-	-	193	-	-	-	193
Municipal Affairs	400	-	-	-	-	-	400
Recreation & Parks	245	105	-	-	-	-	350
Solicitor General	1,087	3,513	-	-	-	-	4,600
Tourism & Small Business	750	740	-	-	-	50	1,540
Treasury	2,138	-	-	-	-	-	2,138
Workers' Health, Safety & Compensation	615	125	125	-	-	-	865
Total	17,274	9,873	1,655	159	5	1,040	30,006

Government of Alberta

TABLE 51. Current Expenditures on R&D in the Social Sciences and Humanities, by Department or Agency and Performer, 1982-83

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Alcoholism & Drug Abuse Commission	-	-	7	-	-	-	7
Attorney General	-	-	290	-	-	-	290
Culture	148	107	41	-	-	-	296
Education	80	50	50	-	5	100	285 (e)
Educational Communications Corporation ACCESS	7	-	-	-	-	-	7 (e)
Environment Council	240	36	-	-	-	-	276
Hospitals & Medical Care	-	-	-	111	-	-	111
Housing & Public Works	-	355	-	-	-	30	385
Mental Health Research Fund	-	-	193	-	-	-	193
Municipal Affairs	321	-	-	-	-	-	321
Workers' Health, Safety & Compensation	-	-	62	-	-	-	62
Total	796	548	643	111	5	130	2,233

Government of Alberta

TABLE 52. Current Expenditures on R&D in the Social Sciences and Humanities, by Department or Agency and Performer, 1983-84

Department or Agency	Intra-mural	Industry	Univer-sities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)						
Alcoholism & Drug Abuse Commission	-	-	7	-	-	-	7
Attorney General	-	-	200	-	-	-	200
Culture	162	117	45	-	-	-	324
Education	80	50	50	-	5	100	285 (e)
Educational Communications Corporation ACCESS	8	-	-	-	-	-	8 (e)
Environment Council	268	80	-	-	-	-	348
Hospitals & Medical Care	-	-	-	111	-	-	111
Housing & Public Works	-	455	-	-	-	30	485
Mental Health Research Fund	-	-	193	-	-	-	193
Municipal Affairs	400	-	-	-	-	-	400
Workers' Health, Safety & Compensation	-	-	100	-	-	-	100
Total	918	702	595	111	5	130	2,461

Government of Alberta

TABLE 53. Application of Expenditures in the Social Sciences and Humanities, by Department or Agency, 1982-83

Department or Agency	Advancement of science	Communi-cations	Energy and fuels				Environmental issues
			Fossil fuels	Hydro electric energy	Nuclear energy	Other	
	($'000)						
Advanced Education & Manpower	-	-	-	-	-	-	-
Alcoholism & Drug Abuse Commission	-	-	-	-	-	-	-
Attorney General	-	-	-	-	-	-	-
Consumer & Corporate Affairs	-	-	-	-	-	-	-
Culture	255	-	-	-	-	-	-
Economic Development	-	-	-	-	-	-	-
Education	-	-	-	-	-	-	-
Educational Communications Corporation ACCESS	-	-	-	-	-	-	-
Environment	-	-	-	-	-	-	-
Environment Council	-	-	-	-	-	-	-
Hospitals & Medical Care	-	-	-	-	-	-	352
Housing & Public Works	-	-	-	-	-	-	-
Labour	-	-	-	-	-	-	-
Mental Health Research Fund	-	-	-	-	-	-	-
Municipal Affairs	-	-	-	-	-	-	-
Recreation & Parks	-	-	-	-	-	-	-
Social Services & Community Health	-	-	-	-	-	-	-
Solicitor General	-	3,208	-	-	-	-	100
Tourism & Small Business	-	-	-	-	-	-	-
Treasury	-	-	-	-	-	-	125
Workers' Health, Safety & Compensation	-	-	-	-	-	-	-
Total	255	3,208	-	-	-	-	577

TABLE 53. Application of Expenditures in the Social Sciences and Humanities, by Department or Agency, 1982-83 - Continued

Government of Alberta

Department or Agency	Health	Industrial and economic development					
		Agriculture	Fisheries	Forestry	Manufac-turing	Minerals	Other
	($'000)						
Advanced Education & Manpower	-	-	-	-	-	-	-
Alcoholism & Drug Abuse Commission	264	-	-	-	-	-	-
Attorney General	-	-	-	-	-	-	-
Consumer & Corporate Affairs	-	-	-	-	-	-	-
Culture	-	-	-	-	-	-	-
Economic Development	-	-	-	474	1,480	35	426
Education	-	-	-	-	-	-	-
Educational Communications Corporation ACCESS	-	-	-	-	-	-	-
Environment	-	-	-	-	-	-	448
Environment Council	-	-	-	-	-	-	-
Hospitals & Medical Care	2,637	-	-	-	-	-	-
Housing & Public Works	-	-	-	-	-	-	485
Labour	-	-	-	-	-	-	-
Mental Health Research Fund	193	-	-	-	-	-	-
Municipal Affairs	-	-	-	-	-	-	-
Recreation & Parks	-	-	-	-	-	-	-
Social Services & Community Health	-	-	-	-	50	-	1,262
Solicitor General	-	-	-	-	-	-	-
Tourism & Small Business	-	-	-	-	-	-	-
Treasury	-	-	-	-	-	-	-
Workers' Health, Safety & Compensation	808	-	-	-	-	-	-
Total	3,902	-	-	474	1,530	35	2,621

Government of Alberta

TABLE 53. Application of Expenditures in the Social Sciences and Humanities, by Department, 1982-83 - Concluded

Department or Agency	Social development and related areas						Total
	Culture, sport and recreation	Education	Human resources	Urban and regional studies	Other	Transportation	
	($'000)						
Advanced Education & Manpower	-	1,186	1,231	-	-	-	2,417
Alcoholism & Drug Abuse Commission	-	-	-	-	-	-	264
Attorney General	-	-	-	-	290	-	290
Consumer & Corporate Affairs	-	-	-	-	143	-	143
Culture	2,000	-	-	-	-	-	2,255
Economic Development	-	-	-	-	-	1,678	4,093
Education	-	3,617	-	-	-	-	3,617 (e)
Educational Communications Corporation ACCESS	-	200	-	-	-	-	200 (e)
Environment	-	-	-	60	-	-	508
Environment Council	-	-	-	-	-	-	352
Hospitals & Medical Care	-	-	-	-	-	-	2,637
Housing & Public Works	-	-	-	320	-	-	805
Labour	-	-	557	-	-	-	557
Mental Health Research Fund	-	-	-	-	-	-	193
Municipal Affairs	-	-	-	321	-	-	321
Recreation & Parks	511	-	-	-	-	-	511
Social Services & Community Health	-	-	-	-	-	-	100
Solicitor General	-	-	-	-	270	-	3,478
Tourism & Small Business	-	-	25	135	-	-	1,597
Treasury	-	-	-	-	1,994	-	1,994
Workers' Health, Safety & Compensation	-	-	-	-	-	-	808
Total	2,511	5,003	1,813	836	2,697	1,678	27,140

Government of Alberta

TABLE 54. Application of Expenditures in the Social Sciences and Humanities, by Department or Agency, 1983-84

Department or Agency	Advancement of science	Communi-cations	Energy and fuels				Environmental issues
			Fossil fuels	Hydro electric energy	Nuclear energy	Other	
	($'000)						
Advanced Education	-	-	-	-	-	-	-
Alcoholism & Drug Abuse Commission	-	-	-	-	-	-	-
Attorney General	-	-	-	-	-	-	-
Consumer & Corporate Affairs	-	-	-	-	-	-	-
Culture	279	-	-	-	-	-	-
Economic Development	-	-	-	-	-	-	-
Education	-	-	-	-	-	-	-
Educational Communications Corporation ACCESS	-	-	-	-	-	-	-
Environment	-	-	-	-	-	-	-
Environment Council	-	-	-	-	-	-	433
Hospitals & Medical Care	-	-	-	-	-	-	-
Housing & Public Works	-	-	-	-	-	-	-
Labour	-	-	-	-	-	-	-
Manpower	-	-	-	-	-	-	-
Manpower	-	-	-	-	-	-	-
Mental Health Research Fund	-	-	-	-	-	-	-
Municipal Affairs	-	-	-	-	-	-	-
Recreation & Parks	-	-	-	-	-	-	-
Solicitor General	-	4,315	-	-	-	-	-
Tourism & Small Business	-	-	-	-	-	-	-
Treasury	-	-	-	-	-	-	-
Workers' Health, Safety & Compensation	-	-	-	-	-	-	-
Total	279	4,315	-	-	-	-	433

Government of Alberta

TABLE 54. Application of Expenditures in the Social Sciences and Humanities, by Department or Agency, 1983-84 - Continued

Department or Agency	Health	Industrial and economic development					
		Agriculture	Fisheries	Forestry	Manufacturing	Minerals	Other
	($'000)						
Advanced Education	-	-	-	-	-	-	-
Alcoholism & Drug Abuse Commission	319	-	-	-	-	-	-
Attorney General	-	-	-	-	-	-	-
Consumer & Corporate Affairs	-	-	-	-	-	-	-
Culture	-	-	-	-	-	-	-
Economic Development	-	-	-	480	1,480	-	450
Education	-	-	-	-	-	-	-
Educational Communications Corporation ACCESS	-	-	-	-	-	-	-
Environment	-	-	-	-	-	-	345
Environment Council	-	-	-	-	-	-	-
Hospitals & Medical Care	3,279	-	-	-	-	-	-
Housing & Public Works	-	-	-	-	-	-	585
Labour	-	-	-	-	-	-	-
Manpower	-	-	-	-	-	-	-
Mental Health Research Fund	193	-	-	-	-	-	-
Municipal Affairs	-	-	-	-	-	-	-
Recreation & Parks	-	-	-	-	-	-	-
Solicitor General	-	-	-	-	-	-	-
Tourism & Small Business	120	-	-	-	70	-	1,175
Treasury	-	-	-	-	-	-	-
Workers' Health, Safety & Compensation	865	-	-	-	-	-	-
Total	4,776	-	-	480	1,550	-	2,555

Government of Alberta

TABLE 54. Application of Expenditures in the Social Sciences and Humanities, by Department, 1983-84 - Concluded

Department or Agency	Social development and related areas					Transportation	Total
	Culture, sport and recreation	Education	Human resources	Urban and regional studies	Other		
	($'000)						
Advanced Education	-	1,245	-	-	-	-	1,245
Alcoholism & Drug Abuse Commission	-	-	-	-	-	-	319
Attorney General	-	-	-	-	200	-	200
Consumer & Corporate Affairs	-	-	-	-	148	-	148
Culture	2,183	-	-	-	-	-	2,462
Economic Development	-	-	-	-	-	1,690	4,100
Education	-	3,617	-	-	-	-	3,617 (e)
Educational Communications Corporation ACCESS	-	220	-	-	-	-	220 (e)
Environment	-	-	-	60	-	-	405
Environment Council	-	-	-	-	-	-	433
Hospitals & Medical Care	-	-	-	-	-	-	3,279
Housing & Public Works	-	-	-	380	-	-	965
Labour	-	-	723	-	-	-	723
Manpower	-	-	1,804	-	-	-	1,804
Mental Health Research Fund	-	-	-	-	-	-	193
Municipal Affairs	-	-	-	400	-	-	400
Recreation & Parks	350	-	-	-	-	-	350
Solicitor General	-	-	-	-	285	-	4,600
Tourism & Small Business	-	20	30	125	-	-	1,540
Treasury	-	-	-	-	2,138	-	2,138
Workers' Health, Safety & Compensation	-	-	-	-	-	-	865
Total	2,533	5,102	2,557	985	2,771	1,690	30,006

TABLE 55. Application of Expenditures in the Social Sciences and Humanities, by Application and Activity, 1982-83

Government of Alberta

Application	Intramural		Extramural		Total
	Research and development	Related scientific activities	Research and development	Related scientific activities	
	($'000)				
Advancement of science	107	-	148	-	255
Communications	-	652	-	2,556	3,208
Energy and fuels:					
Fossil fuels	-	-	-	-	-
Hydro electric energy	-	-	-	-	-
Nuclear energy	-	-	-	-	-
Other	-	-	-	-	-
Environmental issues	240	136	36	165	577
Health	-	2,901	373	628	3,902
Industrial and economic development:					
Agriculture	-	-	-	-	-
Fisheries	-	-	-	-	-
Forestry	-	100	-	374	474
Manufacturing	-	980	-	550	1,530
Minerals	-	5	-	30	35
Other	-	803	385	1,433	2,621
Social development and related areas:					
Culture, sport and recreation	41	2,364	-	106	2,511
Education	97	1,247	205	3,454	5,003
Human resources	-	1,618	-	195	1,813
Urban and regional studies	321	240	-	275	836
Other	-	2,407	290	-	2,697
Transportation	-	765	-	913	1,678
Other	-	-	-	-	-
Total	806	14,218	1,437	10,679	27,140

Government of Alberta

TABLE 58. Application of Expenditures in the Social Sciences and Humanities, by Application and Activity, 1983-84

Application	Intramural		Extramural		Total
	Research and development	Related scientific activities	Research and development	Related scientific activities	
	($'000)				
Advancement of science	117	-	162	-	279
Communications	-	802	-	3,513	4,315
Energy and fuels:					
Fossil fuels	-	-	-	-	-
Hydro electric energy	-	-	-	-	-
Nuclear energy	-	-	-	-	-
Other	-	-	-	-	-
Environmental issues	268	85	80	-	433
Health	-	4,064	411	301	4,776
Industrial and economic development:					
Agriculture	-	-	-	-	-
Fisheries	-	-	-	-	-
Forestry	-	100	-	380	480
Manufacturing	-	1,000	-	550	1,550
Minerals	-	-	-	-	-
Other	-	1,100	485	1,255	2,840
Social development and related areas:					
Culture, sport and recreation	45	2,383	-	105	2,533
Education	98	1,297	205	3,502	5,102
Human resources	-	2,229	-	328	2,557
Urban and regional studies	400	230	-	335	965
Other	-	2,286	200	-	2,486
Transportation	-	770	-	920	1,690
Other	-	-	-	-	-
Total	928	16,346	1,543	11,189	30,006

TABLE 57. Extramural R&D Expenditures in the Social Sciences and Humanities, by Sector of Performance and Application, 1982-83

Government of Alberta

Application	Industry	Universities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)					
Advancement of science	107	41	-	-	-	148
Communications	-	-	-	-	-	-
Energy and fuels:						
Fossil fuels	-	-	-	-	-	-
Hydro electric energy	-	-	-	-	-	-
Nuclear energy	-	-	-	-	-	-
Other	-	-	-	-	-	-
Environmental issues	36	-	-	-	-	36
Health	-	262	111	-	-	373
Industrial and economic development:						
Agriculture	-	-	-	-	-	-
Fisheries	-	-	-	-	-	-
Forestry	-	-	-	-	-	-
Manufacturing	-	-	-	-	-	-
Minerals	-	-	-	-	-	-
Other	355	-	-	-	30	385
Social development and related areas:						
Culture, sport and recreation	-	-	-	-	-	-
Education	50	50	-	5	100	205
Human resources	-	-	-	-	-	-
Urban and regional studies	-	-	-	-	-	-
Other	-	290	-	-	-	290
Transportation	-	-	-	-	-	-
Other	-	-	-	-	-	-
Total	548	643	111	5	130	1,437

Government of Alberta

TABLE 58. Extramural R&D Expenditures in the Social Sciences and Humanities, by Sector of Performance and Application, 1983-84

Application	Industry	Universities	Hospitals and health organizations	Alberta Research Council	Other	Total
	($'000)					
Advancement of science	117	45	-	-	-	162
Communications	-	-	-	-	-	-
Energy and fuels:						
Fossil fuels	-	-	-	-	-	-
Hydro electric energy	-	-	-	-	-	-
Nuclear energy	-	-	-	-	-	-
Other	-	-	-	-	-	-
Environmental issues	80	-	-	-	-	80
Health	-	300	111	-	-	411
Industrial and economic development:						
Agriculture	-	-	-	-	-	-
Fisheries	-	-	-	-	-	-
Forestry	-	-	-	-	-	-
Manufacturing	-	-	-	-	-	-
Minerals	-	-	-	-	-	-
Other	455	-	-	-	30	485
Social development and related areas:						
Culture, sport and recreation	-	-	-	-	-	-
Education	50	50	-	5	100	205
Human resources	-	-	-	-	-	-
Urban and regional studies	-	-	-	-	-	-
Other	-	200	-	-	-	200
Transportation	-	-	-	-	-	-
Other	-	-	-	-	-	-
Total	702	595	111	5	130	1,543

Government of Alberta

TABLE 59. Departmental Personnel Engaged in Social Science Activities, by Department, 1982-83

Department or Agency	Research and development				Related scientific activities			
	Scientific and professional	Technical	Other	Total	Scientific and professional	Technical	Other	Total
	(person-years)							
Advanced Education & Manpower	...	...	...	...	31	-	11	42
Alcoholism & Drug Abuse Commission	...	...	...	...	5	-	1	6
Attorney General	...	...	...	...	...	...	...	...
Consumer & Corporate Affairs	...	...	...	...	4	-	1	5
Culture	4	2	-	6	22	16	8	46
Economic Development	...	...	...	...	70	-	15	85
Education	2	-	2	4	12	1	6	19 (e)
Educational Communications Corporation ACCESS	...	...	...	...	4	-	1	5 (e)
Environment	...	...	...	...	-	-	-	-
Environment Council	13	-	-	13	-	2	2	4
Hospitals & Medical Care	-	-	-	-	18	5	11	34
Housing & Public Works	...	...	...	...	8	1	1	10
Labour	...	...	...	...	11	2	8	21
Mental Health Research Fund	...	...	...	...	...	...	...	...
Municipal Affairs	5	-	1	6	-	-	-	-
Recreation & Parks	...	...	...	...	8	8	-	16
Social Services & Community Health	...	...	...	...	...	...	...	...
Solicitor General	...	...	...	...	13	20	5	38
Tourism & Small Business	...	...	...	...	20	3	5	28
Treasury	...	...	...	...	28	4	25	57
Workers' Health, Safety & Compensation	...	...	...	...	7	4	3	14
Total	24	2	3	29	261	86	103	430

Government of Alberta

TABLE 60. Departmental Personnel Engaged in Social Science Activities, by Department, 1983-84

Department or Agency	Research and development				Related scientific activities			
	Scientific and professional	Technical	Other	Total	Scientific and professional	Technical	Other	Total
	(person-years)							
Advanced Education	...	...	...	...	18	-	2	20
Alcoholism & Drug Abuse Commission	...	...	...	...	5	2	2	9
Attorney General	...	...	...	...	...	...	...	...
Consumer & Corporate Affairs	...	...	...	...	4	-	1	5
Culture	4	2	-	6	22	16	8	46
Economic Development	...	...	...	...	70	-	15	85
Education	2	-	2	4	12	1	6	19 (e)
Educational Communications Corporation ACCESS	...	...	...	...	4	-	1	5 (e)
Environment	...	...	...	...	-	-	-	-
Environment Council	13	-	-	13	-	2	2	4
Hospitals & Medical Care	-	-	-	-	18	7	11	36
Housing & Public Works	...	...	...	...	9	1	1	11
Labour	...	...	...	...	10	2	7	19
Manpower	...	...	...	...	29	-	13	42
Mental Health Research Fund	...	...	...	...	...	...	...	...
Municipal Affairs	6	-	2	8	-	-	-	-
Recreation & Parks	...	...	...	...	7	3	-	10
Social Services & Community Health	...	...	...	...	...	...	...	...
Solicitor General	...	...	...	...	13	20	5	38
Tourism & Small Business	...	...	...	...	21	3	6	30
Treasury	...	...	...	...	28	4	25	57
Workers' Health, Safety & Compensation	...	...	...	...	7	4	3	14
Total	25	2	4	31	277	65	108	450

DEPARTMENTAL NOTES

THE RESPONDENTS
1982-83

Advanced Education and Manpower - Co-ordinator: Asefa Gabregiorgis (427-8501)

Studies are carried out by the Planning Secretariat to assist the development of long range plans and policies in the areas of manpower and advanced education. The other major activity is the operation of the Innovative Projects grant program to support the development and demonstration of innovative instructional techniques. In 1983-84, Advanced Education and Manpower was re-organized into two separate departments.

Agriculture Research Trust - Co-ordinator: Laraine Strafford (432-4931)

The Trust, funded by the provincial government and by industry, supports R&D projects in any aspect of agricultural and food sciences (including rural economy). Projects are carried out mainly in the Alberta universities.

Agriculture - Co-ordinator: Dr. A.O. Olson (427-1957)

The Department operates a number of research centres in Alberta, as well as supporting agriculture related research projects undertaken by universities and provincial research organizations.

Alcoholism and Drug Abuse Commission - Co-ordinator: Art Dyer (427-4275)

The Commission carries out or funds studies required for program evaluation and development.

Attorney General - Co-ordinator: Dennis Medwid (427-4997)

The department makes an annual research grant to the Institute of Law Research and Reform of the University of Alberta.

Consumer and Corporate Affairs - Co-ordinator: John Dunfield (427-6941)

The Research and Planning Division conducts program evaluations, policy analysis and needs assessments in support of departmental progress.

THE RESPONDENTS
(continued)

Culture

The social sciences were reported by Natural Resources Science Centre (John B. Musgrave, 427-9490), and Archaeology Program (Eric Waterton, 427-1727). The reports for Provincial Museum, Archaeological Survey, Research and Policy Planning, and Provincial Archives were estimated by Statistics Canada based on 1981-82 data.

Economic Development - Co-ordinator: Terry Elluk (427-3749)

Five branches are involved in scientific activities: Industry Development, Trade Development, Process Industry Development, Strategic Planning and Transportation Services. The activities undertaken were surveys and special studies to provide information for economic planning and policy formation.

Education - Co-ordinator: Dr. Hastings (427-2991)

A report was not available for the 1982-83 survey. Estimates were made based on the 1981-82 data.

ACCESS Educational Communications Corporation - Co-ordinator: M. Plumb (451-3160)

A report was not available for the 1982-83 survey. Estimates were made based on the 1981-82 data.

Energy and Natural Resources

The Scientific and Engineering and Research Division (Mr. R.D. McDonald, 427-8042) support a large volume of R&D activity, funded mainly through the Alberta/Canada Energy Resources Research Fund. A total of $24 million was committed over a period of three years.

The four other reporting areas Alberta Forest Service (J. Soos, 962-8700), Public Lands Division (R.G. Miller, 427-3563), Fish and Wildlife Division (B.J. Markham, 427-4192), and Resource Evaluation and Planning Division (B.B. Delaney, 427-7222), have research activities in the natural resources.

THE RESPONDENTS
(continued)

Environment - Co-ordinator: Martin Rehn (427-3946)

Most of the activity is in the Natural Sciences with eight divisions reporting. Research Management, Planning, Environmental Assessment, Technical Services, Earth Sciences, Reclamation Branch, Standards and Approvals, and Air Quality Control. A small amount of social is reported by the Planning and Environmental Assessment divisions.

Alberta Environmental Centre - Co-ordinator: Dr. R.S. Weaver (632-6761)

The Centre is an inter-disciplinary research and service agency which studies and solves environmental problems identified by departments and agencies of the Government of Alberta.

Environment Council of Alberta - Co-ordinator: A. Giacomazzi (427-5792)

The Research Division, works in support of environmental issues. The Administration Division offers support through library services and panels and prepares reports and recommendations as well as providing information for various public hearings and policy formulating projects.

Executive Council

Provides R&D grants and contributions to the Alberta Research Council for research in the areas of atmosphere, geology, fossil fuels, microbiology, chemistry and related engineering applications. Data are taken from the Estimates of Expenditures, 1983-84.

Hospitals and Medical Care - Co-ordinator: Dr. Y.M. Cheung (427-1420)

The Heritage Trust fund supports the cancer research performed extramurally by hospitals and health organizations and universities. The heart disease research funds are now part of the departmental budget.

In the social sciences, funding is from within the departmental budget and activities include health care programs, hospital planning and related studies.

THE RESPONDENTS
(continued)

Housing - Co-ordinator: Robert Sloat (427-8150)

The Planning and Research Branch is involved in studies and analysis relating to land and housing.

Labour - Co-ordinator: Janet E. Howell (427-8531)

Wages and benefits as well as other labour information is studied and analyzed and made available for policy making and planning.

Manpower - Co-ordinator: Ian Montgomerie (427-8501)

Prior to 1983-84, the Department of Manpower was included with Advanced Education and Manpower.

Alberta Mental Health Research Fund - Co-ordinator: Dr. R.J. Dyck (427-2813)

The Fund awards grants and contributions to Universities for health related research and development in both natural and social sciences.

Municipal Affairs - Co-ordinator: Boyd Oberhoffner (427-2225)

The Research and Development Branch are involved in urban and regional studies.

Alberta Oil Sands Technology and Research Authority - Co-ordinator: W.G. Kowaluk (427-7623)

Alberta Heritage Trust is the primary source of funds for AOSTRA which awards numerous contracts for research and development. The industry sector receives the majority of the money with universities and the Alberta Research Council getting most of the remainder.

Recreation and Parks - Co-ordinator: Mike Boyd (422-1730)

Natural and social related scientific activities are reported by the Planning Secretariat for culture, sport and recreation application.

THE RESPONDENTS
(concluded)

Social Services and Community Health - Co-ordinator: Merrilyn Greig (427-1366)

The projects mainly include special services and studies necessary in programs of the department such as social and health needs of Albertans, manpower planning, and development.

Solicitor General - Co-ordinator: A. Sangadasa (427-0366)

Computer and Research Services are developing information systems and conducting research in criminal justice.

Tourism and Small Business - Co-ordinator: John Peters (427-4837)

Projects are classified as related scientific activities and involve evaluations, studies and surveys on tourism and related products.

Transportation - Co-ordinator: J. Konarzewski (427-2750)

All projects are reported as natural sciences even though there could be some social implications. This is due to the technical and engineering aspects of the work relating to transportation.

Alberta Treasury - Co-ordinator: O. DeVries (427-3058)

The Alberta Bureau of Statistics undertakes projects such as statistical surveys, information services and economic studies.

Workers Health, Safety and Compensation - Co-ordinator: Joanne Sokoloski (427-6971)

The Heritage Trust Fund and Workers Compensation Board Assessment Revenue support a large portion of the social science projects. Related Scientific Activities in the natural sciences for the purposes of health are funded by the departmental budget.

THE RESPONDENTS

Alberta Government Science Survey,

1974-75 to 1982-83

Alberta Departments included in the Provincial Government Science Survey

1974-75	1975-76	1976-77	1977-78
Advanced Education	Advanced Education & Manpower	Advanced Education & Manpower	Advanced Education & Manpower
Agriculture (e)	Agriculture (e)	Agriculture (e)	Agriculture
			Alcoholism & Drug Abuse Commission
	Attorney General	Attorney General	Attorney General
Business Development & Tourism	Business Development & Tourism	Business Development & Tourism	Business Development & Tourism
Consumer & Corporate Affairs	Consumer & Corporate Affairs	Consumer & Corporate Affairs	Consumer & Corporate Affairs
Culture, Youth & Recreation	Culture (e)	Culture	Culture
Education (e)	Education	Education	Education
	Educational Communi-cations Corporation	Educational Communi-cations Corporation	Educational Communi-cations Corporation
Energy Resources Conservation Board	Energy and Natural Resources	Energy and Natural Resources	Energy and Natural Resources
Environment	Environment	Environment	Environment
Environment Conservation Authority	Environment Conservation Authority	Environment Conservation Authority	Environment Council (e)
Health Care Insurance Commission	Health Care Insurance Commission	Health Care Insurance Commission	

Alberta Departments included in the Provincial Government Science Survey - continued

1978-79	1979-80	1980-81	1981-82	1982-83
Advanced Education & Manpower	Advanced Education & Manpower	Advanced Education & Manpower	Advanced Education & Manpower	Advanced Education & Manpower
Agriculture	Agriculture	Agriculture	Agriculture	Agriculture
Agricultural Research Trust	Agricultural Research Trust	Agricultural Research Trust	Agricultural Research Trust	Agricultural Research Trust
Alcoholism & Drug Abuse Commission	Alcoholism & Drug Abuse Commission	Alcoholism & Drug Abuse Commission	Alcoholism & Drug Abuse Commission	Alcoholism & Drug Abuse Commission
Attorney General	Attorney General	Attorney General	Attorney General	Attorney General
Consumer & Corporate Affairs	Consumer & Corporate Affairs	Consumer & Corporate Affairs	Consumer & Corporate Affairs	Consumer & Corporate Affairs
Culture	Culture	Culture	Culture	Culture
Economic Development	Economic Development	Economic Development	Economic Development	Economic Development
Education	Education	Education	Education	Education
Education Communi-cations Corporation	Education Communi-cations Corporation	Education Communi-cations Corporation	Education Communica-tions Corp. ACCESS	Education Communica-tions Corp. ACCESS
Energy and Natural Resources	Energy and Natural Resources	Energy and Natural Resources	Energy and Natural Resources	Energy and Natural Resources
Environment	Environment	Environment	Environment	Environment
		Environment Centre	Environment Centre	Environment Centre
Environment Council	Environment Council	Environment Council	Environment Council	Environment Council
Executive Council	Executive Council	Executive Council	Executive Council	Executive Council

Alberta Departments included in the Provincial Government Science Survey - continued

1974-75	1975-76	1976-77	1977-78
			Hospitals & Medical Care
Hospital Services Commission	Hospital Services Commission	Hospital Services Commission	
Housing Corporation	Housing Corporation		
Housing & Public Works	Housing & Public Works	Housing & Public Works	Housing & Public Works
	Labour (5 month report)	Labour	Labour
Lands & Forests (e)			
Manpower & Labour			
Mines & Minerals			
Municipal Affairs	Municipal Affairs	Municipal Affairs	Municipal Affairs
Northern Development			
Office of Program Co-ordinator			
		Oil Sands Technology & Research Authority	Oil Sands Technology & Research Authority
	Recreation, Parks & Wildlife	Recreation, Parks & Wildlife	Recreation, Parks & Wildlife
Social Services & Community Health	Social Services & Community Health	Social Services & Community Health (e)	Social Services & Community Health
Solicitor General	Solicitor General	Solicitor General	Solicitor General

Alberta Departments included in the Provincial Government Science Survey - continued

1978-79	1979-80	1980-81	1981-82	1982-83
Hospitals & Medical Care	Hospitals & Medical Care	Hospitals & Medical Care	Hospitals & Medical Care	Hospitals & Medical Care
Housing and Public Works	Housing and Public Works	Housing and Public Works	Housing and Public Works	Housing
Labour	Labour	Labour	Labour	Labour
Mental Health Research Fund	Mental Health Research Fund	Mental Health Research Fund	Mental Health Research Fund	Mental Health Research Fund
Municipal Affairs	Municipal Affairs	Municipal Affairs	Municipal Affairs	Municipal Affairs
Oil Sands Technology & Research Authority	Oil Sands Technology & Research Authority	Oil Sands Technology & Research Authority	Oil Sands Technology & Research Authority	Oil Sands Technology & Research Authority
Recreation & Parks (unavailable)	Recreation & Parks	Recreation & Parks	Recreation & Parks	Recreation & Parks
Social Services & Community Health	Social Service & Community Health	Social Services & Community Health	Social Services & Community Health	Social Services & Community Health
Solicitor General	Solicitor General	Solicitor General	Solicitor General	Solicitor General

Alberta Departments Included in the Provincial Government Science Survey - concluded

1974-75	1975-76	1976-77	1977-78
Task Force on Urban ization & the Future			
Transportation	Transportation	Transportation	Transporation
Treasury	Treasury	Treasury	Treasury
Utilities & Telephones			
Workers' Compensation Board	Workers' Compensation Board	Workers' Compensation Board	Nil

Alberta Departments included in the Provincial Government Science Survey - concluded

1978-79	1979-80	1980-81	1981-82	1982-83
Tourism & Small Business	Tourism & Small Business	Tourism & Small Business	Tourism & Small Business	Tourism & Small Business
Transportation	Transportation	Transportation	Transportation	Transportation
Treasury	Treasury	Treasury	Treasury	Treasury
Workers' Compensation Board				
Workers' Health, Safety & Compensation	Workers' Health, Safety & Compensation	Workers' Health, Safety & Compensation	Workers' Health, Safety & Compensation	Workers' Health, Safety & Compensation

Appendix B - Questionnaires and Guide: Provincial Government Survey

PROVINCIAL GOVERNMENT ACTIVITIES

IN THE

NATURAL SCIENCES

PROVINCE OF ALBERTA

QUESTIONNAIRE AND GUIDE

FISCAL YEAR 1982-83

Department or Agency		Reporting Unit
Coordinator	Mailing Address	Telephone No.
Enquiries to be directed to	Telephone No.	Date

INTRODUCTION

This questionnaire covers natural science activities funded by the provincial government. It includes expenditure and personnel data for research and development (R & D) and related scientific activities. All departments and agencies known to be conducting or funding activities in the natural sciences are included.

The classification used in this questionnaire will not necessarily correspond to existing accounting systems or organizational units. Accurate data, therefore, depend on the good will and intelligent judgement of the responding officers. Information is required which describes the characteristics and magnitude of the department's activities; it is not a matter of decimal precision of data.

The data collected provide useful information for the development and analysis of provincial science policy. These statistics are also included with data collected from other sectors to provide national aggregates published by Statistics Canada. Data are released only with the approval of the provincial government.

This questionnaire includes only scientific activities in the natural sciences and technology.

Natural sciences and technology include the following disciplines:

Life sciences	— medical and biological
Physical sciences	— chemistry, physics and astronomy
Environment sciences	— geology, oceanography and the study of the atmosphere
Engineering sciences	— architecture, civil engineering, etc.
Mathematical sciences	

If departmental scientific activities involve natural science disciplines, complete this questionnaire.

The social sciences and humanities include such disciplines as:

Anthropology	Law
Business administration and commerce	Library science
Communications	Philosophy
Criminology	Political science
Demography	Psychology
Economics	Religious studies
Geography	Social work
History	Sociology
Languages, literature and linguistics	Urban and regional studies

If departmental scientific activities involve these disciplines, complete the separate questionnaire on activities in the social sciences and humanities.

In many instances, particularly in health fields, it will be difficult to distinguish between the natural and the social sciences. In such instances, however, some allocation must be made. Respondents should consider the main orientation of the projects involved and the field of training of the personnel in determining this allocation. Any measure which reflects the actual situation is acceptable.

Scientific Activities

The activities which concern us are those scientific and technological (S & T) activities which involve the generation, dissemination and initial application of new scientific and technological knowledge. The central activity is research and experimental development (R & D). In addition, there are a number of activities closely related to R & D. Included in this survey are: education support, technical surveys, information services, special services and studies, and museum services.

Research and Experimental Development

Research and experimental development (R & D) is defined as creative work undertaken on a systematic basis to increase the stock of scientific and technical knowledge and to use this knowledge in new applications.

The central characteristic of R & D is an appreciable element of novelty and of uncertainty. *New* knowledge, products or processes are sought. The work is normally performed by, or under the supervision of, persons with post-graduate degrees in the natural sciences or engineering.

R & D is generally carried out by specialized R & D units. However, an R & D project may also involve the use of non-R & D facilities (e.g. testing grounds), the purchase or construction of specialized equipment and materials, and the assistance of other units. Costs of such items, attributable to the project, are to be considered R & D costs.

R & D units may also be engaged in non-R & D activities such as technical advisory services, testing, and construction of special equipment for other units. So far as it is practical, the effort devoted to such operations should be excluded from R & D.

On the other hand, R & D may be carried out by units normally engaged in other functions (e.g. a marine survey ship used for hydrological research, a geological survey team directed to work in a certain area in order to provide data for a geophysical research project). Such effort is part of an R & D project and, again so far as is practical, the costs should be assigned to R & D expenditures.

Examples:

1. The development of new methods of identifying tree species and checking their condition is R & D; the use of recently developed methods, such as remote sensing and i[illegible]-red photography, as part of normal forestry surveys, is not.

2. The operation of a new transportation system as a demonstration project is not R & D; however, the *creation* of the system as a *prototype* and the evaluation of its operations should be considered R & D.

3. Grants to provide equipment for an R & D laboratory are to be considered R & D; grants to provide the same equipment primarily for teaching or medical care should not be considered R & D.

Related Scientific Activities

Education support — grants to individuals or institutions intended to support the advanced education of students in technology and the natural sciences. Report grants intended primarily to support the research activities of individuals as R & D (either R & D grants or research fellowships).

Technical surveys — activities directed towards the exploration and systematic description of the earth and its natural resources.

The activities which make up technical surveys include the gathering, processing, collating and analyzing of data on natural phenomena except when part of a research project or a museum service. The preparation of maps and survey reports, their printing and cataloguing, are also included.

Typical technical surveys are regular geological, hydrographic, and topographic surveys; routine astronomic observations; establishment and maintenance of meteorological records; soil, plant, fisheries, and wildlife surveys; routine soil and water tests; and monitoring of radioactivity levels.

Information services — all work directed to recording, classifying, translating, and disseminating scientific and technological information. Included are the operations of scientific and technical libraries, the publication of scientific journals and bibliographies, and the organizing of scientific conferences. Grants for the publication of scholarly works are also included.

General purpose information services or information services directed primarily toward the general public are excluded, as are general departmental and public libraries. When individual budgets exist, the costs of libraries which belong to institutions otherwise entirely classified to another activity, such as R & D or Technical surveys, should be assigned to Information services. S & T advisory and consultancy services for industry and agriculture are part of Information services. The costs of printing and distributing reports from activities such as Technical surveys or R & D are attributable to those activities.

Special services and studies — work directed towards the establishment of national and provincial standards for materials, devices, products and processes; the calibration of secondary standards; non-routine quality testing; feasibility studies and demonstration projects.

Feasibility studies are technical investigations of proposed engineering projects to provide additional information required to reach decisions on implementation. Demonstration projects involve the operation of scaled-up versions of a facility or process, or prototypes, after the R & D is completed, to provide additional data on factors such as costs, operational characteristics, market demand and public acceptance. Projects called "demonstration projects" but which conform to the definition of R & D should be considered R & D. Once a facility or process is operated primarily to provide a service or to gain revenue, rather than as a demonstration, it should no longer be considered in Special services and studies. In all demonstration projects, only the *net* costs should be considered.

Museum services — comprise the collecting, cataloguing, and displaying of specimens of the natural world or of representations of natural phenomena. The scientific activities of natural history museums, zoological and botanical gardens, aquaria, planitaria, and nature reserves are included.

The activity represents a systematic attempt to preserve and display items from the natural world; in some ways it could be considered an extension of information services. Parks which are not primarily restricted reserves for certain fauna or flora are not included. In all cases the costs of providing entertainment and recreation to visitors should be excluded (e.g. restaurants, children's gardens and nurseries).

If practical, resources of such institutions devoted to other activities, such as R & D or Information services, should be excluded from Museum services and assigned to those activities.

When a museum covers not only natural history but also aspects of human cultural activities, the museum's resources should be prorated between the natural and the social sciences. However, museums of science and technology, which display man-made objects and also may illustrate the operation of scientific "laws", should be considered in Museum services in the social sciences and humanities.

1. UNITS OF DEPARTMENT WHICH CARRIED OUT SCIENTIFIC ACTIVITIES (p. 1)

List those units (section/division/branch/station/group) of the department which carry out scientific activities and check the appropriate activity. If most of the units of a larger organization are engaged in the same activity, only the larger unit need be identified.

The list should help you to ensure that all the activities of the department are considered and that smaller units are not overlooked. It will also assist the data users to better understand the nature of the various scientific activities performed and could serve as a starting point for users requiring more information on some aspect of the department's activities.

II. MAJOR PAYMENTS FOR SCIENTIFIC ACTIVITIES (p. 2)

Enter the name and city of each recipient of a major payment (≥$25,000) and enter the payment in the appropriate activity column. Both grants and contracts are included.

The information provided here will assist you to complete Question III, the "key" question in the survey. It will also be used by Statistics Canada to ensure that major external performers of scientific activities are included in surveys of the other sectors.

Replies to this question will be treated as confidential by both Statistics Canada and the provincial government.

III. PERFORMERS OF SCIENTIFIC ACTIVITIES (p. 3)

Performers

Intramural — the reporting department. The scientific work is normally carried out by personnel assigned to the department and usually in facilities of the department. Also included are the administration of extramural programs, the costs of acquiring land, buildings and equipment to be used in scientific activities, and contracts to provide services required for scientific projects (e.g. rental of aircraft, computer services).

Industry — Canadian business and government enterprises. Include public utilities and government-owned firms as well as non-profit institutions and associations mainly serving industry and not controlled by another institution (e.g. Pulp and Paper Research Institute). Consultants providing scientific and engineering services are also included. Industrial research institutes affiliated with a university belong in the Universities sector.

Universities — Canadian universities and affiliated institutes owned, administered or staffed by them (e.g. Atlantic Industrial Research Institute of Nova Scotia Technical College). Teaching facilities in non-university hospitals are included.

Hospitals and health organizations — Canadian hospitals and health organizations which are not part of university medical schools.

Provincial research organizations — The Nova Scotia Research Council, the New Brunswick Research and Productivity Council, le Centre de recherche industrielle du Québec, the Ontario Research Foundation, the Manitoba Research Council, the Saskatchewan Research Council, the Alberta Research Council, and the Research Council of British Columbia.

Other — the federal government, municipal governments, individuals and institutions not identified with any other sector, and foreign performers.

Activities — the activities of research and development (R & D) and related scientific activities have been defined above. These activities are further classified by type of expenditure.

Current expenditures — expenditures on items such as personnel, transportation and communications, information, professional and special services, rentals, purchased repair and upkeep, utilities, materials and supplies. Current expenditures for R & D are divided as follows:

In-house R & D — R & D performed by personnel of the reporting department. It may include R & D carried out on behalf of another department and covered by a transfer of funds, as well as services provided by other organizations (e.g. computing, transportation).

R & D contracts — payments to other organizations to carry out R & D intended to directly benefit the reporting department. The administration of R & D contracts is an intramural cost.

R & D grants and contributions — payments to other organizations (or individuals) for R & D intended basically to benefit the recipient of the grant. Contributions and loans should be considered as grants. The administration of R & D grants and contributions is an intramural cost.

Research fellowships — payments to individuals for advanced research training and experience. The aim of the program should be research training rather than education.

Capital expenditures — expenditures on the construction and acquisition of land, buildings, machinery, and equipment.

IV. SOURCES OF FUNDS FOR SCIENTIFIC ACTIVITIES (p. 3)

This question identifies the sources of funds for the total expenditures on scientific activities reported in Question III. It will help to ensure that work funded from outside the department is not overlooked.

From departmental budget — that portion of the total departmental budget which was spent on natural science activities.

From other departments — money transferred from another provincial department to this one for activities in the natural sciences. Include when applicable, provincial portions of any federal-provincial cost sharing programs and identify the program.

From the Federal government — all funds from the federal government used for natural science activities. The funds are referred to as payments, contributions, transfers, etc. Also include federal portions of any federal-provincial cost sharing programs and identify the program.

From trust funds — all funds from trust funds used for natural science activities.

From other sources — all funds for natural science activities from sources not specified above such as reserve funds, revenues from sales or fees.

V. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES (p.4)

The objectives listed are not mutually exclusive, nor do they represent the total range of possible objectives. They are, however, intended to cover the major areas of current economic, political and technological interest. This list is common to both the social and natural sciences.

Report expenditures under the objective which is primary to that expenditure. Generally, the objective selected should be consistent with the stated objectives of the reporting department.

Advancement of science — activities for the development of general scientific knowledge (e.g. general R & D grants to universities or support of fields such as astronomy and archaeology).

Communications — activities in support of the development and regulation of communication services, including telecommunications.

Energy and fuels:

Fossil fuels — activities concerned with the exploration, extraction, refining, use and conservation of crude oils, natural gas and coal.

Hydro electric energy — activities directed towards the generation, use and conservation of hydro electric power.

Nuclear energy — activities directed towards the development and use of nuclear energy, including safety and wastes management.

Other (specify) any other activities not covered by those listed above e.g. solar energy, biomass energy etc.

Environmental issues — activities aimed at preserving or restoring environmental quality, including scientific work on pollution but excluding medical aspects. For example, R & D on diseases caused by pollution should be reported under the health objective.

Health — activities related to the maintenance and improvement of the physical well-being of the population.

Industrial and economic development:

Agriculture — activities which support the agricultural industry.

Fisheries — activities which support the fishing industry.

Forestry — activities which support the forestry industry.

Manufacturing — measures intended to achieve efficient and sustained growth in manufacturing industries, and the encouragement of the production of new goods and services.

Minerals — activities related to the location, extraction, processing, use and conservation of mineral resources (except fuels).

Other (specify) — any objectives not covered by those listed above.

Social development and related areas:

Culture, sport and recreation — activities related to the support and development of culture, physical fitness, sport and recreation. Include wilderness recreation and conservation of fauna and flora.

Education — education support, grants for education research, activities in support of education policy.

Human resources — activities directed towards the development and utilization of the labour force. Labour relations, personnel policy and training programs, demographic and immigration studies are included.

Urban and regional studies — studies directed towards understanding communities and improving life within the urban and rural community.

Other — other activities directed towards social well-being (e.g. administration of justice, consumer protection).

Transportation — activities in support of the development and regulation of transportation services.

Other (specify) — any objectives not covered by those listed above.

VI. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES (p. 5)

The categories used to classify personnel will generally correspond to those used by the provincial government. The definitions given below indicate the training and educational level generally required for such categories. In all cases, however, consider the job classification, not the person's qualifications, because there will be some employees who exceed the qualifications required by the job (e.g. a person with a degree in a technical or clerical position).

Scientific and professional — people in jobs that require at least one academic degree or nationally recognized professional qualification (e.g. chartered accountant — C.A.) as well as those with equivalent experience.

Technical — people in jobs that require specialized vocational or technical training beyond the secondary level (e.g. community colleges and technical institutes) as well as those with experience equivalent to this training.

Other — clerical, secretarial, administrative, operational and other support personnel.

Data are requested by activity and category of employment in person-years or full-time equivalent. Persons engaged only in a scientific activity are considered one person-year. Those working part-time only on scientific activities are considered as a fraction corresponding to their involvement. Include both permanent and non-permanent employees.

Care should be taken to ensure that the personnel data reported are consistent with the expenditure data. This is the most common reason for questioning the validity of a return.

NS

Province Alberta

Department

I A. UNITS OF DEPARTMENT WHICH CARRIED OUT SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page ii)

Unit	Research and experimental development	Related scientific activities
	(✓)	

I B. DESCRIPTION OF INTRAMURAL ACTIVITIES

Briefly describe the intramural scientific activities of the reporting department. Describe major current projects rather than overall programs. Attach any relevant material (papers, annual reports, etc.) which provide descriptions of departmental activities.

NS

Province Alberta
Department _____

II A. MAJOR PAYMENTS FOR SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page iii)

Recipient	Research and experimental development	Related scientific activities
	$000	

II B. DESCRIPTION OF EXTRAMURAL ACTIVITIES

Briefly describe extramural projects, or programs, and identify the sectors in which they are conducted. If descriptive material or lists of projects are available they may be submitted in lieu of completing this question.

NS

Province Alberta

Department

III. PERFORMERS OF SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page III)

Scientific activity	1. Intramural activities	Payments to: 2. Industry	3. Universities	4. Hospitals & health organizations	5. Provincial research organizations	6. Other	7. Total 1982-83
	$000						
Research and experimental development (R & D):							
Current expenditures:							
1. In-house R & D							
2. R & D contracts							
3. R & D grants and contributions							
4. Research fellowships							
5. Sub-total (1 + 2 + 3 + 4)							
6. Capital expenditures							
Related scientific activities (RSA):							
7. Current expenditures							
8. Capital expenditures							
9. TOTAL EXPENDITURES							

IV. SOURCES OF FUNDS FOR SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page III)

	$000
1. From departmental budget	
2. From other departments	
3. From federal government (specify source)	
4. From trust funds	
5. From other sources (reserve funds, revenues from sales or fees)	
6. TOTAL EXPENDITURES	

NS

Province Alberta

Department

V. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page iv)

Objective	Intramural		Extramural		TOTAL
	R & D	Related scientific activities	R & D	Related scientific activities	
	$000				
1. Advancement of science					
2. Communications					
Energy and fuels:					
3. Fossil fuels					
4. Hydro electric energy					
5. Nuclear energy					
6. Other (specify)					
7. Environmental issues					
8. Health					
Industrial and economic development:					
9. Agriculture					
10. Fisheries					
11. Forestry					
12. Manufacturing					
13. Minerals					
14. Other (specify)					
Social development and related areas:					
16. Culture, sport and recreation					
17. Education					
18. Human resources					
19. Urban and regional studies					
20. Other (specify)					
21. Transportation					
22. Other (specify)					
23. TOTAL	[1]	[2]	[3]	[4]	

[1] Equal to Section III: column 1, rows 5 and 6
[2] Equal to Section III: column 1, rows 7 and 8
[3] Equal to Section III: columns 2, 3, 4, 5 and 6 row 5
[4] Equal to Section III: columns 2, 3, 4, 5 and 6 row 7

Province Alberta

Department

VI. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page v)

Type of personnel	1. R & D	2. Related scientific activities	3. Total 1982-83
	Person-years		
1. Scientific and professional			
2. Technical			
3. Other			
4. TOTAL PERSONNEL			

Province Alberta

Department

VII. PERFORMERS OF SCIENTIFIC ACTIVITIES, 1983-84 (ESTIMATES)

Scientific activity	1. Intramural activities	Payments to: 2. Industry	3. Universities	4. Hospitals & health organizations	5. Provincial research organizations	6. Other	7. Total 1983-84
	$000						
Research and experimental development (R & D):							
Current expenditures:							
1. In-house R & D							
2. R & D contracts							
3. R & D grants and contributions							
4. Research fellowships							
5. Sub-total (1 + 2 + 3 + 4)							
6. Capital expenditures							
Related scientific activities (RSA):							
7. Current expenditures							
8. Capital expenditures							
9. TOTAL EXPENDITURES							

VIII. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES, 1983-84 (ESTIMATES)

Type of personnel	1. R & D	2. Related scientific activities	3. Total 1983-84
	Person-years		
1. Scientific and professional			
2. Technical			
3. Other			
4. TOTAL PERSONNEL			

NS

Province Alberta

Department

IX. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES, 1983-84 (ESTIMATES)

Objective	Intramural		Extramural		TOTAL
	R & D	Related scientific activities	R & D	Related scientific activities	
	$000				
1. Advancement of science					
2. Communications					
Energy and fuels:					
3. Fossil fuels					
4. Hydro electric energy					
5. Nuclear energy					
6. Other (specify)					
7. Environmental issues					
8. Health					
Industrial and economic development:					
9. Agriculture					
10. Fisheries					
11. Forestry					
12. Manufacturing					
13. Minerals					
14. Other (specify)					
Social development and related areas:					
16. Culture, sport and recreation					
17. Education					
18. Human resources					
19. Urban and regional studies					
20. Other (specify)					
21. Transportation					
22. Other (specify)					
23. TOTAL	1	2	3	4	

[1] Equal to Section VII: column 1, rows 5 and 6
[2] Equal to Section VII: column 1, rows 7 and 8
[3] Equal to Section VII: columns 2, 3, 4, 5 and 6 row 5
[4] Equal to Section VII: columns 2, 3, 4, 5 and 6 row 7

PROVINCIAL GOVERNMENT ACTIVITIES
IN THE
SOCIAL SCIENCES AND HUMANITIES

PROVINCE OF ALBERTA

QUESTIONNAIRE AND GUIDE

FISCAL YEAR 1982-83

Department or Agency		Reporting Unit	
Coordinator	Mailing Address		Telephone No.
Enquiries to be directed to		Telephone No.	Date

INTRODUCTION

This questionnaire covers activities in the social sciences and humanities funded by the provincial government. It includes expenditure and personnel data for research and development (R & D) and related scientific activities. All departments and agencies known to be conducting or funding activities in the social sciences are included.

The classifications used in this questionnaire will not necessarily correspond to existing accounting systems or organizational units. Accurate data, therefore, depend on the good will and intelligent judgement of the responding officers. Information is required which describes the characteristics and magnitude of the department's scientific activities; it is not a matter of decimal precision of data.

The data collected provide useful information for the development and analysis of provincial science policy. These statistics are also included with data collected from other sectors to provide national aggregates published by Statistics Canada. Data are released only with the approval of the provincial government.

This questionnaire includes only scientific activities in the social sciences and humanities.

The social sciences and humanities include such disciplines as:

Anthropology
Business administration and Commerce
Communications
Criminology
Demography
Economics
Geography
History
Languages, literature and linguistics
Law
Library science
Philosophy
Political science
Psychology
Religious studies
Social work
Sociology
Urban and regional studies

If departmental scientific activities involve these disciplines, complete this questionnaire.

Natural sciences and technology include the following disciplines:

Life sciences — medical and biological
Physical sciences — chemistry, physics and astronomy
Environmental sciences — geology, oceanography and the study of the atmosphere
Engineering sciences — architecture, civil engineering, etc.
Mathematical sciences

If departmental scientific activities involve these disciplines, complete the separate questionnaire on the natural sciences and technology.

In many instances, particularly in health fields, it will be difficult to distinguish between the social and natural sciences. In such instances, however, some allocation must be made. Respondents should consider the main orientation of the projects involved and the field of training of the personnel in determining this allocation. Any measure which reflects the actual situation is acceptable.

Scientific Activities

The activities which concern us are those scientific and technological (S & T) activities which involve the generation, dissemination and initial application of new scientific and technological knowledge. The central activity is research and experimental development (R & D). In addition, there are a number of activities closely related to R & D. Included in this survey are: education support, statistical surveys, information services, special services and studies, and museum services.

Research and Experimental Development

Research and experimental development (R & D) is defined as creative work undertaken on a systematic basis towards the acquisition of new knowledge about man, his actions and his institutions, and the application of this knowledge in new ways.

Both "research" and "development" are often used with different meanings in the government. For example, it is increasingly common to hear that someone is researching something, i.e., the person is looking for information about something.

Similarly, there are many units with either research or development or both terms in their titles which are concerned primarily with information gathering, speech writing, preparation of position papers or departmental organization.

R & D requires the acquisition of knowledge and not just information. New knowledge involves the integration of newly acquired information into existing hypotheses, the formulation and testing of new hypotheses or the reevaluation of existing observations.

An R & D project generally has three characteristics:

— a substantial element of uncertainty, novelty and innovation;
— a well-defined project design;
— a report on the procedures and results of the project.

"Many social scientists perform work in which they bring the established methodologies and facts of the social sciences to bear upon a particular problem, but which cannot be classified as research. The following are examples of work which might come in this category and are *not* R & D: interpretative commentary on the probable economic effects of a change in the tax structure, using existing economic data; forecasting future changes in the pattern of the demand for social services within a given area arising from an altered demographic structure; operations research as a contribution to decision-making, e.g. planning the optimal distribution system for a factory; the use of standard techniques in applied psychology to select and classify industrial and military personnel, students, etc., and to test children with reading or other disabilities."
(Frascati Manual)

Related Scientific Activities

Education support — consists of grants to individuals or institutions intended to support the advanced education of students in the social sciences and humanities. Report grants intended to support the research activities of individuals as R & D (either R & D grants or research fellowships).

Statistical surveys — the collecting, processing and disseminating of statistics on man, his economic and social activities. Included are the development of technical methodology and statistical analysis.

The institutions involved are the statistical bureaux of provincial governments and the statistical sections of departments and agencies. If there are units whose principal activity is R & D, their costs and personnel should be assigned to R & D; specialized libraries with separate budgets should be assigned to Information services.

Information services — all work directed to recording, classifying, translating, and disseminating information resulting from R & D in the social sciences or required in support of such R & D. Included are the operations of specialized libraries and archives, the publication of scholarly journals and bibliographies, and the organizing of scientific conferences. Grants for the publication of scholarly works are also included.

General purpose information services or information services directed primarily toward the general public are excluded, as are general departmental and public libraries. When individual budgets exist, the costs of libraries which belong to institutions otherwise entirely classified to another activity, such as R & D or Statistical surveys, would be assigned to information services. The costs of printing and distributing reports from activities such as Statistical surveys or R & D are attributable to those activities.

Special services and studies — systematic investigations carried out in order to provide information needed for planning or policy formulation. Demonstration projects are also included.

The work is usually carried out by specialized units in some government departments, by consultants, by royal commissions, and by task forces. The activity is similar to R & D since it may require innovative analyses and a high degree of scientific ability. However, such studies are not intended to acquire new knowledge but to provide specific answers to specific problems (generally immediate, localized and perhaps temporary). The day-to-day operations of units concerned with departmental planning, organization or management are not normally included but special projects may be relevant.

Examples of special studies would be a study of the viability of a petrochemical complex in a certain region of Canada, the Royal Commission on Poverty, the MacKenzie Valley Pipeline Inquiry, the Science Council's special studies, and the Manitoba Guaranteed Income Experiment (net costs).

Museum services — the collecting, cataloguing, and displaying of specimens and representations relating to the history, social organization, and creations of man.

The activity represents a systematic attempt to preserve and display the works of man and to provide information on his works, history, and nature. The scientific activities of historical museums, archaeological displays, and art galleries are included. In all cases, the costs of providing entertainment and recreation to visitors should be excluded (e.g. restaurants, children's gardens, and nurseries).

If practical, resources of such institutions devoted to other activities, such as R & D or Information services, should be excluded from Museum services and assigned to those activities.

When a museum also covers aspects of natural history, the museum's operations should be divided between the social and natural sciences. However, museums of science and technology, war, etc., which display man-made objects and may also illustrate the operations of certain technologies, should be considered as Museum services in the social sciences and humanities.

I. UNITS OF DEPARTMENT WHICH CARRIED OUT SCIENTIFIC ACTIVITIES (p. 1)

List those units (section/division/branch/station/group) of the department which carry out scientific activities and check the appropriate activity. If most of the units of a larger organization are engaged in the same activity, only the larger unit need be identified.

The list should help you to ensure that all the activities of the department are considered and that smaller units are not overlooked. It will also assist the data users to better understand the nature of the various scientific activities performed and could serve as a starting point for users requiring more information on some aspect of the department's activities.

II. MAJOR PAYMENTS FOR SCIENTIFIC ACTIVITIES (p. 2)

Enter the name and city of each recipient of a major payment (≥$25,000) and enter the payment in the appropriate activity column. Both grants and contracts are included.

The information provided here will assist you to complete Question III, the "key" question in the survey. It will also be used by Statistics Canada to ensure that major external performers of scientific activities are included in surveys of the other sectors.

Replies to this question will be treated as confidential by both Statistics Canada and the provincial government.

III. PERFORMERS OF SCIENTIFIC ACTIVITIES (p. 3)

Performers

Intramural — the reporting department. The scientific work is normally carried out by personnel assigned to the department and usually in facilities of the department. Also included are the administration of extramural programs, the costs of acquiring land, buildings and equipment to be used in scientific activities, and contracts to provide services required for scientific projects (e.g. rental of aircraft, computer services).

Industry — Canadian business and government enterprises. Include public utilities and government-owned firms as well as non-profit institutions and associations mainly serving industry and not controlled by another institution (e.g. Pulp & Paper Research Institute). Consultants providing scientific and engineering services are also included. Industrial research institutes affiliated with a university belong in the Universities sector.

Universities — Canadian universities and affiliated institutes owned, administered or staffed by them (e.g. Atlantic Industrial Research Institute of Nova Scotia Technical College). Teaching facilities in non-university hospitals are included.

Hospitals and health organizations — Canadian hospitals and health organizations which are not part of university medical schools.

Provincial research organizations — The Nova Scotia Research Council, the New Brunswick Research and Productivity Council, le Centre de recherche industrielle du Québec, the Ontario Research Foundation, the Manitoba Research Council, the Saskatchewan Research Council, the Alberta Research Council, and the Research Council of British Columbia.

Other — the federal government, municipal governments, individuals and institutions not identified with any other sector, and foreign performers.

Activities — the activities of research and development (R & D) and related scientific activities have been defined above. These activities are further classified by type of expenditure.

Current expenditures — expenditures on items such as personnel, transportation and communications, information, professional and special services, rentals, purchased repair and upkeep, utilities, materials and supplies. Current expenditures for R & D are divided as follows:

In-house R & D — R & D performed by personnel of the reporting department. It may include R & D carried out on behalf of another department and covered by a transfer of funds, as well as services provided by other organizations (e.g. computing, transportation).

R & D contracts — payments to other organizations to carry out R & D intended to directly benefit the reporting department. The administration of R & D contracts is an intramural cost.

R & D grants and contributions — payments to other organizations (or individuals) for R & D intended basically to benefit the recipient of the grant. Contributions and loans should be considered as grants. The administration of R & D grants and contributions is an intramural cost.

Research fellowships — payments to individuals for advanced research training and experience. The aim of the program should be research training rather than education.

Capital expenditures — expenditures on the construction and acquisition of land, buildings, machinery, and equipment.

IV. SOURCES OF FUNDS FOR SCIENTIFIC ACTIVITIES (p. 3)

This question identifies the sources of funds for the total expenditures on scientific activities reported in Question III. It will help to ensure that work funded from outside the department is not overlooked.

From departmental budget — that portion of the total departmental budget which was spent on social science activities.

From other departments — money transferred from another provincial department to this one for activities in the social sciences. Include when applicable, provincial portions of any federal-provincial cost sharing programs and identify the program.

From the Federal government — all funds from the federal government used for social science activities. The funds are referred to as payments, contributions, transfers, etc. Also include federal portions of any federal-provincial cost sharing programs and identify the program.

From trust funds — all funds from trust funds used for social science activities.

From other sources — all funds for social science activities from sources not specified above such as reserve funds, revenues from sales or fees.

V. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES (p. 4)

The objectives listed are not mutually exclusive, nor do they represent the total range of possible objectives. They are, however, intended to cover the major areas of current economic, political and technological interest. This list is common to both the social and natural sciences.

Report expenditures under the objective which is primary to that expenditure. Generally, the objective selected should be consistent with the stated objectives of the reporting department.

Advancement of science — activities for the development of general scientific knowledge (e.g. general R & D grants to universities or support of fields such as astronomy and archaeology).

Communications — activities in support of the development and regulation of communication services, including telecommunications.

Energy and fuels:

Fossil fuels — activities concerned with the exploration, extraction, refining, use and conservation of crude oils, natural gas and coal.

Hydro electric energy — activities directed towards the generation, use and conservation of hydro electric power.

Nuclear energy — activities directed towards the development and use of nuclear energy, including safety and wastes management.

Other (specify) any other activities not covered by those listed above e.g. solar energy, biomass energy etc.

Environmental issues — activities aimed at preserving or restoring environmental quality, including scientific work on pollution but excluding medical aspects. For example, R & D on diseases caused by pollution should be reported under the health objective.

Health — activities related to the maintenance and improvement of the physical well-being of the population.

Industrial and economic development:

Agriculture — activities which support the agricultural industry.

Fisheries — activities which support the fishing industry.

Forestry — activities which support the forestry industry.

Manufacturing — measures intended to achieve efficient and sustained growth in manufacturing industries, and the encouragement of the production of new goods and services.

Minerals — activities related to the location, extraction, processing, use and conservation of mineral resources (except fuels).

Other (specify) — any objectives not covered by those listed above.

Social development and related areas:

Culture, sport and recreation — activities related to the support and development of culture, physical fitness, sport and recreation. Include wilderness recreation and conservation of fauna and flora.

Education — education support, grants for education research, activities in support of education policy.

Human resources — activities directed towards the development and utilization of the labour force. Labour relations, personnel policy and training programs, demographic and immigration studies are included.

Urban and regional studies — studies directed towards understanding communities and improving life within the urban and rural community.

Other — other activities directed towards social well-being (e.g. administration of justice, consumer protection).

Transportation — activities in support of the development and regulation of transportation services.

Other (specify) — any objectives not covered by those listed above.

VI. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES (p. 5)

The categories used to classify personnel will generally correspond to those used by the provincial government. The definitions given below indicate the training and educational level generally required for such categories. In all cases, however, consider the job classification, not the person's qualifications, because there will be some employees who exceed the qualifications required by the job (e.g. a person with a degree in a technical or clerical position).

Scientific and professional — people in jobs that require at least one academic degree or nationally recognized professional qualification (e.g. chartered accountant — C.A.) as well as those with equivalent experience.

Technical — people in jobs that require specialized vocational or technical training beyond the secondary level (e.g. community colleges and technical institutes) as well as those with experience equivalent to this training.

Other — clerical, secretarial, administrative, operational and other support personnel.

Data are requested by activity and category of employment in person-years or full-time equivalent. Persons engaged only in a scientific activity are considered one person-year. Those working part-time only on scientific activities are considered as a fraction corresponding to their involvement. Include both permanent and non-permanent employees.

Care should be taken to ensure that the personnel data reported are consistent with the expenditure data. This is the most common reason for questioning the validity of a return.

SS

Province Alberta

Department

I A. UNITS OF DEPARTMENT WHICH CARRIED OUT SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page ii)

Unit	Research and experimental development	Related scientific activities
	(✓)	

I B. DESCRIPTION OF INTRAMURAL ACTIVITIES

Briefly describe the intramural scientific activities of the reporting department. Describe major current projects rather than overall programs. Attach any relevant material (papers, annual reports, etc.) which provide description of departmental activities.

SS

Province Alberta
Department

II A. MAJOR PAYMENTS FOR SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page ii)

Recipient	Research and experimental development	Related scientific activities
	$000	

II B. DESCRIPTION OF EXTRAMURAL ACTIVITIES

Briefly describe extramural projects, or programs, and identify the sectors in which they are conducted. If descriptive material or lists of projects are available they may be submitted in lieu of completing this question.

SS

Province Alberta

Department

III. PERFORMERS OF SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page ii)

Scientific activity	1. Intramural activities	Payments to: 2. Industry	3. Universities	4. Hospitals & health organizations	5. Provincial research organizations	6. Other	7. Total 1982-83
	$000						
Research and experimental development (R & D):							
Current expenditures:							
1. In-house R & D							
2. R & D contracts							
3. R & D grants and contributions							
4. Research fellowships							
5. Sub-total (1 + 2 + 3 + 4)							
6. Capital expenditures							
Related scientific activities (RSA):							
7. Current expenditures							
8. Capital expenditures							
9. **TOTAL EXPENDITURES**							

IV. SOURCES OF FUNDS FOR SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page iii)

	$000
1. From departmental budget	
2. From other departments	
3. From federal government (specify source)	
4. From trust funds	
5. From other sources (reserve funds, revenues from sales or fees)	
6. **TOTAL EXPENDITURES**	

SS

Province Alberta

Department

V. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page iii)

Objective	Intramural		Extramural		TOTAL
	R & D	Related scientific activities	R & D	Related scientific activities	
	$000				
1. Advancement of science					
2. Communications					
Energy and fuels:					
3. Fossil fuels					
4. Hydro electric energy					
5. Nuclear energy					
6. Other (specify)					
7. Environmental issues					
8. Health					
Industrial and economic development:					
9. Agriculture					
10. Fisheries					
11. Forestry					
12. Manufacturing					
13. Minerals					
14. Other (specify)					
Social development and related areas:					
16. Culture, sport and recreation					
17. Education					
18. Human resources					
19. Urban and regional studies					
20. Other (specify)					
21. Transportation					
22. Other (specify)					
23. TOTAL	[1]	[2]	[3]	[4]	

[1] Equal to Section III: column 1, rows 5 and 6
[2] Equal to Section III: column 1, rows 7 and 8
[3] Equal to Section III: columns 2, 3, 4, 5 and 6 row 5
[4] Equal to Section III: columns 2, 3, 4, 5 and 6 row 7

Province Alberta

Department

VI. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES, 1982-83 (Instructions — Page iv)

Type of personnel	1. R & D	2. Related scientific activities	3. Total 1982-83
	Person-years		
1. Scientific and professional			
2. Technical			
3. Other			
4. TOTAL PERSONNEL			

Province Alberta

Department

VII. PERFORMERS OF SCIENTIFIC ACTIVITIES, 1983-84 (ESTIMATES)

Scientific activity	1. Intramural activities	Payments to: 2. Industry	3. Universities	4. Hospitals & health organizations	5. Provincial research organizations	6. Other	7. Total 1983-84
	$000						
Research and experimental development (R & D):							
Current expenditures:							
1. In-house R & D							
2. R & D contracts							
3. R & D grants and contributions							
4. Research fellowships							
5. Sub-total (1 + 2 + 3 + 4)							
6. Capital expenditures							
Related scientific activities (RSA):							
7. Current expenditures							
8. Capital expenditures							
9. **TOTAL EXPENDITURES**							

VIII. DEPARTMENTAL PERSONNEL ENGAGED IN SCIENTIFIC ACTIVITIES, 1983-84 (ESTIMATES)

Type of personnel	1. R & D	2. Related scientific activities	3. Total 1983-84
	Person-years		
1. Scientific and professional			
2. Technical			
3. Other			
4. **TOTAL PERSONNEL**			

NS

Province Alberta

Department

IX. OBJECTIVES OF EXPENDITURES ON SCIENTIFIC ACTIVITIES, 1983-84 (ESTIMATES)

Objective	Intramural		Extramural		TOTAL
	R & D	Related scientific activities	R & D	Related scientific activities	
	$000				
1. Advancement of science					
2. Communications					
Energy and fuels:					
3. Fossil fuels					
4. Hydro electric energy					
5. Nuclear energy					
6. Other (specify)					
7. Environmental issues					
8. Health					
Industrial and economic development:					
9. Agriculture					
10. Fisheries					
11. Forestry					
12. Manufacturing					
13. Minerals					
14. Other (specify)					
Social development and related areas:					
16. Culture, sport and recreation					
17. Education					
18. Human resources					
19. Urban and regional studies					
20. Other (specify)					
21. Transportation					
22. Other (specify)					
23. TOTAL	1	2	3	4	

[1] Equal to Section VII: column 1, rows 5 and 6
[2] Equal to Section VII: column 1, rows 7 and 8
[3] Equal to Section VII: columns 2, 3, 4, 5 and 6 row 5
[4] Equal to Section VII: columns 2, 3, 4, 5 and 6 row 7

Appendix C - Methodology Used In Producing Estimates for the University Sector

1. Expenditure Estimates

Data on research expenditures in the public and private sectors used in this report were compiled through annual surveys. There is, however, no such survey of research expenditures by universities in Alberta. As a result, the procedure for estimating these figures developed by the Canadian Association of University Business Officers (CAUBO) has been adopted for this purpose. The methodology is documented in detail in the Report of the Study on the Costs of University Research, August, 1982.

Universities are typically engaged in two types of research activity:

> Sponsored Research is research activity for which financial support is derived from sources external to the university. This includes funds transferred from trusts and endowments for research purposes, contracts, or grants in aid of research, but does not include research sponsored directly by the university.
>
> Non-Sponsored Research is research activity which is initiated and funded solely from within the university.

The university contributes in various ways toward the support of both types of research. This is done through allocations made from its operating funds, derived primarily from governmental sources, tuition fees and donations. These allocations support not only all costs associated with non-sponsored research, but also such indirect costs associated with sponsored research as professional salaries and support services such as libraries, computers, administration, consumable supplies and physical plant.

Therefore, in terms used in this report, Alberta's universities, through their operating funds, support all costs associated with non-sponsored research, both direct and indirect, and the indirect costs of sponsored research. Other sectors (the Federal Government, Industry and the Alberta Government, through

contract and non-operating research grants) are the source of funds for all direct costs of sponsored research performed at Alberta's universities. The total dollar value of all research performed by Alberta's universities is, then, the sum of all the direct and indirect costs of both sponsored and non-sponsored research.

1.1 Derivation of Research Expenditures

Based on the CAUBO methodology, research expenditures are calculated from the total operating expenditures of each university. Total operating expenditures are all expenditures made by the university including those from the general operating fund, trust and endowment funds, and sponsored research allocations, but excluding those from the capital account.

These expenditures have been broken down by faculty with general costs of the university being distributed across each faculty according to its proportion of total faculty expenditure. Faculties are classified according to the Statistics Canada classification of education disciplines. These "discipline groups" are:

1) Education, including Physical Education
2) Humanities, Fine Arts and Social Sciences
3) Business, Administration and Law
4) Physical and Applied Sciences

Multipliers have been derived from the CAUBO study which express, for each discipline group, total research expenditures as a proportion of total operating expenditures. These proportions are reported in Table 1.

When these proportions are applied to values given for sponsored research, trusts and endowments and operating expenditures as reported in the annual financial statements for each university, the form of the relationship becomes:

$$TR = TE(M_1)$$

where:

TR = Total Research Expenditures.
TE = Total Operating Expenditures as reported, including sponsored research, and trusts and endowments.
M_1 = Proportion of TE attributable to research.

The formula is applied to each of the four discipline groups, and the figures are summed to obtain an estimate of total research expenditures by the institution.

2. Personnel Estimates

It is also necessary to estimate the amount of personnel time devoted to research and development. This involves beginning with Full-Time Equivalent data for both full-time and part-time academic staff in teaching faculties at Alberta's universities. It is assumed that the nature of the faculty determines to some extent the proportion of time available for research activity. For this reason the CAUBO methodology also forms the basis for estimates of person-years for research and development.

CAUBO recognizes faculty time can be apportioned to at least three activities: instruction, research, and community and professional service. CAUBO's "Empirical Faculty Activities Analysis" shows research time for all disciplines averages 26 percent. More recent discussion by CAUBO and others suggests that this multiplier may be unrealistically low. Until a better methodology can be devised, it is believed that the average of 36 percent for research time (as employed in previous reports), is a more suitable multiplier for estimating person-years devoted to research and development.

TABLE 1

Multipliers Used in the Derivation of University Research Expenditures by Discipline Group

Discipline Group	Total Research Expenditures as a Percentage of Total Operating Expenditures (M_1)
Education	17
Humanities and Social Sciences	33
Business Administration and Law	25
Physical and Applied Sciences	45
Total Combined	**36**